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LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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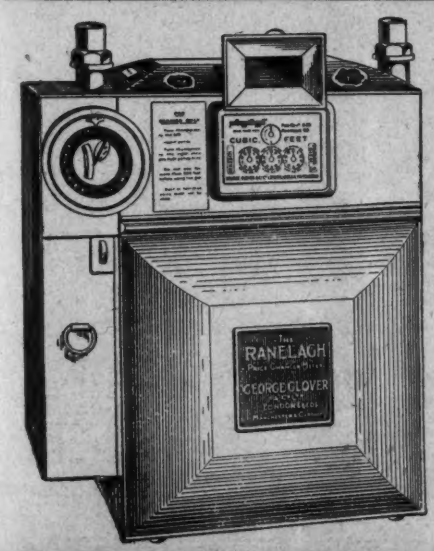

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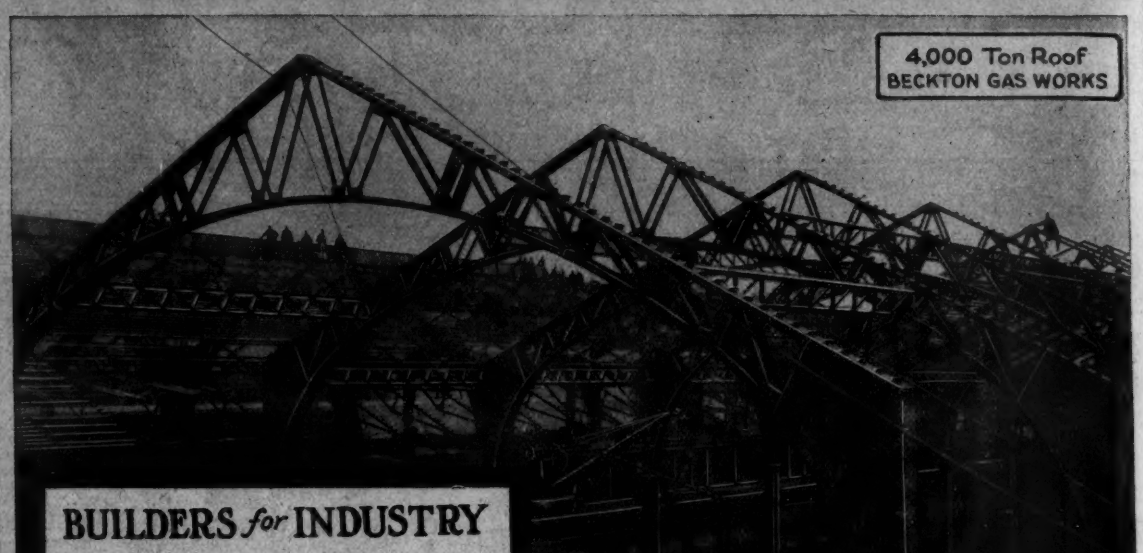

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EDITORIAL NOTES.

Predictions and Actualities.

WE all fully recognize the considerable liberty that the Gas Regulation Act conferred upon the gas industry; but this was not granted without a countervailing addition to the gas-testing conditions. That is the price of the extra liberty, but it is a price worth paying. Both changes must and will benefit the industry. The liberty enlarges its technical and commercial scope; and the more exacting provisions regarding testing will not only protect the gas consumers, but will help to maintain the prestige of the industry. However, whatever change is effected, there are always people who, at the outset, will be found to grumble, find fault, and criticize. The gas industry has not been exempt from this characteristic of some human natures in connection with the new Act. With elevated eyebrows certain people expressed surprise at an enlightened Parliament conferring upon a public utility industry the power of working under the most economical conditions in their local circumstances; some dismal people prognosticated that the liberty would be used to the advantage of the industry, and to the detriment of the consumers. It was beyond their compass to see that—apart from the fact that the industry is not conducted by sharpers—competition, practical considerations, an administrative regard for the interests of the industry, combined with the statutory protection of the consumers, would all keep the industry in the straight path. In the narrow minds of these people, the industry would do many things which they thought they ought not to do. They would be supplying gas of extremely low calorific value; gas containing an abnormal quantity of inerts and of carbon monoxide; the (as amended under the Act) standard and maximum prices allowed when costs were at their worst were going to affect the consumers injuriously—high prices would be maintained, and high dividend paying would be rampant.

What has actually happened? The predictions have all been falsified; the recommendations of the Fuel Research Board and the Board of Trade, and the acceptance of them by Parliament, have been justified. No one has anything of which to complain. The statutory section of the industry has settled down in large part under the new powers, and is preparing to do so in the other part, with a wise discretion—being guided by a judicious consideration of each and every factor that exerts any influence upon its position, fortunes, and stability.

Let us take first the declarations of calorific power; and the predictions that the heat value of a cubic foot of gas would go tumbling down at a remarkable rate, in the quest for the transfer into gas of as much as possible of the thermal value of the coal carbonized. There were advisers who wished to hurry the industry into this change. But the industry is not in the habit of being hurried. It prefers evolution to revolution; it inclines to caution rather than to imprudence. Moreover, the industry could not sacrifice the capital invested in existing gas-producing plant. It could not sacrifice the satisfaction of, and therefore business with, its customers, through the inability of numerous established gas-consuming appliances to negotiate a gas of extremely low (contrasted with existing practice) calorific value. It has to work from present conditions gradually as opportunity allows to the goal of ultimate economy, according to the circumstances of each undertaking. There is scope for this. The Board of Fuel Research recognized this, so did the Board of Trade, and so did Parliament. Discretion is revealed in what has been done. Those who counselled a long flight from one calorific value to another have been disappointed; so, we think, have been those who foreshadowed that this was the detrimental course which would be taken. Nothing of the kind has occurred. It is three years now since the Act was passed, and the bulk of the declarations of calorific values are between 450 and 500 B.Th.U. At the opening stages of the new liberty, the greatest percentage of declarations showed from 450 to 475 B.Th.U., with from 480 B.Th.U. to 500 B.Th.U. taking second place. The figures below 450 B.Th.U. and the figures above 500 B.Th.U. were few in comparison. Let us take the new declarations as found in the recently issued Board of Trade returns relating to the manufacturing and sales operations of the statutory undertakings during 1922. There were 165 declarations in that year to add to the 184 declarations in 1921. Of the 165, the 500 B.Th.U. declarations took the lead with 58; 450 B.Th.U. declarations came next, with 35; 475 B.Th.U., with 18; 470 B.Th.U., with 10; 460 B.Th.U., with 9; 480 B.Th.U., with 8; 425 B.Th.U., with 7; 400 B.Th.U., with 4; 440 B.Th.U., with 3; 490 B.Th.U., with 2; and 430, 420, and 320 B.Th.U., with 1 each. It will be seen from these figures that nothing extravagant has occurred in the way of low declarations. Only seventeen of the declarations last year were below 450 B.Th.U. And it is the South Oxfordshire Company who are down to 320 B.Th.U. The present tendency seems to be between 450 and 500 B.Th.U., with 500 B.Th.U., in prevailing circumstances, largely favoured; but this does not bind the industry for the future. It exemplifies what can be done best under existing conditions. It leaves the way open to developments which will tend to beneficial economies and efficiencies, both for the industry and the consumers. Looking at the declarations above the datum line of 500 B.Th.U., it is observed that only eight concerns made declarations in excess: Two, 510 B.Th.U.; one, 530 B.Th.U.; four, 550 B.Th.U.; and one, 560 B.Th.U. Eleven companies raised their previous declarations during the year—in some cases to 475 B.Th.U., and in others to 500 B.Th.U. A few went above 500 B.Th.U. The 184 declarations in 1921 and the 165 in 1922 make 349; but this total has been largely increased in the last eight months. We predict the time is approaching—seeing there are only 482 statutory companies in Great Britain—when the municipal authorities who have not yet thought fit to make application under section 1 of the Act will be dealt with; for one thing is certain, after the report of the Departmental (Therm Charges) Committee, the Board of Trade will see to it that the co-ordinating intentions of the Act are fulfilled.

It is plain from what has preceded that the fears regarding low calorific powers have not materialized. Nor have they in any other respect. There are the inerts. What is happening in regard to them? Technical endeavour is to get them down to the minimum. One of the influences of the therm is to induce gas engineers to do all possible to utilize their purifying plants, gasholders, and distribution systems for as little as possible of that which does not count in the therm basis of charging, although we must not forget the lesson that Prof. Bone has recently given us that nitrogen is not always an inert; according to the use of the gas, it may be an actively beneficial agent. As a matter of fact, where the charge is on the heat value system, we hear nothing whatever about incombustibles. Ill-forebodings in that direction have died a natural death. Concerning carbon monoxide, the returns do not show an average use

of blue water gas by any undertaking that need intensify the "anxiety" of those who have tried to create public alarm—and have failed. Prof. Bone has taken a leading part in urging restriction of this constituent. After studying his recent discourse on gaseous combustion at high pressures, which gives the results of his researches into this fascinating subject, we are wondering whether the time may come when the gas industry will discontinue to reproach him, and instead confer upon him its blessings for showing the way in which carbon monoxide can be utilized in a manner that will make the coal-carbonizing industries completely the masters in the fertilizer fields. Time will show. But anyway for the time being we can claim that of the liberty of the gas industry advantage has not been taken in distributing an excessive quantity of carbon monoxide in the gas.

Then, again, there are the standard and maximum prices first granted under the Act. The narrow-minded people who thought they were dealing with a venal rather than with a discreet and honest industry, must have been disappointed to find two strongly marked features in the recent administration of gas companies. First, rapid reductions of prices to the consumers; and, secondly, a refusal to take advantage, in the payment of dividends, of the standard prices that were allowed in times of much higher costs than rule at the present. Gas companies have done nothing such as was anticipated by certain men of little minds. Wisdom has characterized their procedure in this respect as in others. They have justified the confidence of Parliament; and Parliament in the event has been justified in placing confidence in the industry. Discretion and honesty are not any more absent from the administrators of the gas industry than they are from their suspicious critics. The former realize their trust; they have large interests to defend; and they have keen competition to face from coal, electricity, and oil. The mass of antagonistic prediction that followed the passing of the Gas Regulation Act has been crushed to pieces by the actual procedure and operations of the industry during the three years that have passed since the Act received the Royal Assent.

Gas Administrators and the Education Scheme.

To devise schemes for higher education and training for the work of the gas industry is one thing; to put them into successful and general operation is another. To get them established and successfully at work calls for universal and whole-hearted co-operation. The professional men of the industry have endorsed the education and examination scheme which the Institution of Gas Engineers, in collaboration with the Board of Education, have launched in respect of the technical side of the industry, as well as the one which is in preparation for the commercial side, an outline of the basic features of which latter was given some time ago by Mr. F. W. Goodenough, the Executive Chairman of the British Commercial Gas Association. We are not, however, at all sure that, generally speaking, Boards of Directors and Gas Committees of local authorities at present fully appreciate the importance of these schemes in making adequate provision of men with the right qualifications to carry-on the ever-growing and more responsible work that is coming upon the industry. The right men—the fully competent men—will in future take a very prominent part in the promotion of the *financial* prosperity of the industry. We have deliberately emphasized the word "financial," because we particularly desire the administrators of the affairs of gas undertakings to consider in all its bearings the matter of these educational schemes, and with just as much interest and concern as they have for the capital account and the earnings year by year. There is very good reason for this, seeing that, without their assistance, the education and examination schemes must fall very far short of the maximum benefit which they can yield to the industry. There are several ways in which gas administrators can give the movement a good start; and the same ways are the ones by which, when the movement has realized a definite beginning, it can be maintained in effective work and results. Just now people are holiday making; but directly the holidays are over, there is hope that the question will be brought under the consideration of Directors and Committeemen, and that there will be forthcoming from them the evidence of lively interest and hearty support.

In other columns this week, we have an article by Mr. Walter Hole, the Organizing Secretary to the Education Scheme. From his contribution it is apparent that the scheme yet has certain difficulties to encounter before it can be said to be clearly on the way to the successful issues for which those are hoping who have the best interests of the industry at heart. In the first place, there is wanting a supply of suitable teachers. The difficulty, it seems, is not an insuperable one—men only need inducement to respond to the call to fill the position. This is not going to be a perennial difficulty; but it is a difficulty—and a very real one—at the outset. Relief from it, it appears to us, rests in the hands of gas administrators. It is plain from what Mr. Hole says that there are plenty of qualified men in the industry who could undertake the work. So far so good. But there the trouble comes in. Such qualified men are not likely to relinquish the posts in which they are established—posts probably with good prospects attached—unless they are assured of suitable or equal recognition of their services. We cannot expect these men to look at this matter from an altruistic, philanthropic, or sentimental standpoint. Why should they? The second paragraph of Mr. Hole's article, however, indicates that the men who would be required for teachers would not have to give up their present offices; the work would be something "additional" to that upon which they are now engaged. "The "man in responsible office," writes Mr. Hole, "naturally "feels some reluctance to undertake additional tasks, in "view of the business conditions of to-day." That is quite true—the claims of business to-day are generally sufficient for most men; and to many they leave, as it is, little time for leisure. But Mr. Hole emphasizes consideration for the future of the industry; and then comes this question:

> Is it, therefore, too much to appeal to every qualified man, if any call should come his way, to accept it, if at all possible, and make the self-sacrifice involved a contribution to the future of the industry he is proud to serve?

That is a point which requires an explanatory extension. What in this connection does "self-sacrifice" mean? Does it suggest voluntary service, without any recognition but the consciousness that one has done good duty for the industry, supplemented by the thanks of his fellows? If there are men who would be satisfied with such reward, then they would be given a cordial welcome. But we think that an industry of the status of that of the gas industry should not expect, in educational work of this kind, free service; it should be prepared to offer adequate recompense for it—at any rate, until the scheme reaches maturity and produces teachers of its own. That is a point upon which explanation will be required. There are qualified men who would sacrifice leisure, if, by so doing, they secured some material acknowledgment; and they would well deserve it. There is no question that in Mr. Hole's mind "for the next "year or two the difficulty"—that of the supply of qualified teachers—"is going to be a very serious one." If there are "plenty of qualified men, fully capable of undertaking this duty," then there should be ways and means of securing their services. It is a point for the consideration of the powers that be, how these services are to be obtained; and "the powers that be" include gas administrators.

Then, the second important question raised in the article is the granting, by the administrators of the industry, of facilities for study to all their employees likely to profit by them. Regarding this, we are afraid that gas administrators will want a few pertinent questions answered. In the first place, they will desire to know the school, college, or university most available to their area that will be taking-up the courses of instruction in compliance with the scheme; and they will want information as to the time that will be involved, in order to determine how best they can serve the end in view by internal work rearrangements, so that the members of their staffs and other employees may gain the greatest benefit. As yet there has not been sufficient fundamental information published on which administrators of gas concerns can undertake to do their complementary part in furthering the schemes. This, of course, can only be furnished when the universities, colleges, and technical schools make the necessary announcements as to their programmes for giving effect to the scheme. Just now vacations are on; but time is passing, and hope has been expressed that the scheme will come into full swing in the next educational session. Of course, all this preparatory work may be well under way. We have, however, no knowledge regarding it; and the sooner there is publication the better, in order that administrators of gas undertakings

and prospective students may know—the former more precisely what is expected of them; the latter, their educational engagements for next session.

There is another direction—and this is an important part of Mr. Hole's article—in which gas administrators can supply encouragement in connection with the scheme. It is by the offering of suitable rewards to successful students. Increased qualification and competence of an employee means to an employer increased worth. New developments create new obligations; and if gas administrators are satisfied as to higher qualification and competence of staff being one of the essentials to the future success of the industry, then it is their business to provide every possible encouragement to the promotion of that essential. Several gas undertakings already do this. Their administrators appreciate the value of encouragement; and they have experienced the valuable effects. The encouragement is of a material character. A good example is the one quoted by Mr. Hole, which is in operation in connection with the Birmingham Corporation Gas Department. The Gas Committee of that city have ever been in the van in all things pertaining to the progress of the industry's interests; and, though there are changes from time to time in the constitution of the Committee, it is obvious that they do not intend to allow their reputation in this regard to suffer. The outline of the scheme of encouragement in respect of educational work which is incorporated in Mr. Hole's article is published through the courtesy of Mr. A. W. Smith, the Secretary and General Manager of the Department. We will not enter into the particulars in this editorial reference, except to say that the scheme applies to the technical and clerical staffs, and to wage earners of the department. To successful students money prizes are given; and, in certain cases, success carries with it an advance in salary or wages. Such encouragement needs no commendation. A little stimulant of the kind does no harm to anyone. It is good wherever administered.

There are other points in Mr. Hole's article; among them some explanations which still appear to be necessary in order to clear away certain misunderstandings concerning the Institution scheme. But this comment on the article is, in the first place, addressed to the administrators of gas undertakings; and, in the second place, one or two suggestions are made which may move Mr. Hole to lift the curtain a little more, with the view to render aid more particularly to the administrators of undertakings, in order to enable them to set about the co-operative work which is expected of, and is necessary from, them in the furtherance of the educational and examination scheme.

Housing and Gas and Electricity Supplies.

THE assistance that the new Housing Act is rendering to local authorities and private enterprise in the building of small dwellings for workmen ought to supply a considerable supplement to the scope of the gas industry for new business. The Director-General of Housing of the Ministry of Health (Sir Charles Ruthen) seems to be well satisfied with the way the Act is working. Operations actually started before the Act received the Royal Assent. With the approval of the Ministry of Health, 228 local authorities proceeded with the building of houses to the number of 14,723, and, in addition, local authorities received sanction to subsidize private enterprise to the extent of 6329 houses. Private enterprise has finished, since Sept. 30 last, nearly 15,000 houses, which are tenanted and entered on the rate-books; and to-day 18,000 more are in process of erection. Actually, therefore, there are 21,052 houses being built under the new Act, subsidized by the State, and nearly 18,000 houses are being constructed by unaided private enterprise. Beyond these, there are 7257 houses in course of erection, which represent the outstanding balance under the old State-aided scheme. Thus approximately the number of houses of all kinds being built in the country at the present time exceeds 46,000.

One stimulus to this improved condition of things is the enormous decline in the cost of building materials. Perhaps the costs of gas-fitting materials and appliances have not fallen in the same proportion; but they have declined since the first considerable housing schemes were carried out. Gas had then, and has now, a considerable pull over electricity in the matter of installation and working economy. Seeing that an effort was made in these houses to provide, as far as was judicious, labour-saving appliances, and that central powers saw considerable waste in providing two services, where one would suffice, for the purposes of lighting, heating, and cooking, to the lot of gas suppliers fell a goodly share of new business. But it must not be taken for granted that, owing to this, the further business will automatically fall into their net, particularly in areas where the local authorities are also the suppliers of electric current. Gas and electricity salesmen will both be on the alert and very active; but the reductions in the price of cable, wiring, fittings, lamps, current, &c., will be made the ground for a reconsideration of the claims of electricity. Nevertheless, the waste of a double service cannot be disposed of by words; the double costs will still stand out boldly. The solid economy of gas, in comparison with electricity, to the tenants of these houses must also be a factor for consideration. It should, in truth, be the primary consideration, and not the fact that by imposing dearer electrical operation upon the tenants, the local electricity department will receive benefit. That is not a sufficient justification. These new houses, which are being built by State aid, are intended to benefit the people; and therefore the utmost advantage in economy should be obtained for them throughout.

In various parts of the country, another effort is at the present time being made by municipalities owning electricity undertakings (private enterprise cannot afford to do this, or to run the risk) to instal electricity in tenement dwellings — one, two, and three room tenements — and various schemes are under consideration. The landlords will not incur the expenditure for wiring, or enter into the speculative work of trying to get back their money by an additional payment by the tenants. The tenants are of opinion that they already pay quite sufficient for a place in which to live. They are not demanding electricity; and the landlords see no reason why it should be thrust upon them —especially having in view the fact that gas is by far the cheaper agent to instal, and to use. However, our "Electricity Supply Memoranda" this week shows what is being done in this respect. Heavy capital expenditure is being proposed by municipalities; and liberal computations are being made as to the resulting revenue. If municipalities are relying upon these revenue calculations, we are afraid some of them will be grievously disappointed in the result. We of the gas industry know how vagarious is the consumption by different consumers of this class, although most of them also use gas for purposes other than lighting; but there are few such people who will be able to afford electric appliances for cooking and heating. If the electricity undertaking provided them, they would have to fix an additional slot meter to allow the consumers to have the current used at power rates, *plus* a percentage addition to represent the rent of the appliances, even if the consumption did not satisfy, in the way of return, the legitimate rental claims of the appliances. Electric lighting alone will not in all cases furnish revenue sufficient to pay for the expenditure involved in equipping (say) a one or two roomed tenement. In our opinion, large ratepayers ought to insist, where these schemes are entered upon, that separate accounts relating to them should be kept by the electricity departments, with all charges involved in the service carefully entered, in order that an examination can be made of the items to ascertain whether or not the business is being carried on at a loss, or is actually fruitful. From our experience the slot-meter business in gas supply, and taking into account the differences in the conditions of service compared with electricity, there is good ground for believing that these differences will weigh heavily against electricity in securing a profitable business in this particular direction.

The Laird and the Carbon Monoxide Bee.

WE do not know Councillor Dr. Laird, of Macclesfield; but we gather (from an address he recently delivered to less than a score of working men at the local Beaconsfield Club) that he is possessed of some extravagant notions regarding carbon monoxide in town gas, that he is very illogical in what he says on the subject, and that in the address he does not reveal any capacity for applying to his elementary knowledge of the toxic quality of carbon monoxide the best of all tests—that of general experience. He tries the effect of placing his own diminutive experience (in which he has not sufficient confidence to express himself in positive terms) against a world-wide use of town gas over decades and in, year by year, enormously increasing volumes; and he calls to his aid the case of a factory in which there is a misuse of gas.

He thinks these are sufficient, mixed with a little postulation as to leaking pipes, to justify a demand for the reduction of the carbon monoxide content of the local gas supply—carbon monoxide which, for its radiating property and other effects in the mechanism of a flame, has advantages of considerable importance in many purposes for which coal gas is used. The obviously little knowledge of the doctor on this subject is for him a dangerous thing. He does not (according to the report of his lecture in the "Macclesfield Courier") appear to wish the gas-works any harm; but, whether or not he wishes it, his superficial treatment of the subject is a fairly certain way of influencing some people who perhaps have less knowledge of the matter than he has himself.

Unreservedly we accept the proposition of the doctor that the question of the distribution of gas used for illuminating and heating purposes must be regarded from the health, as well as the financial, point of view. But the doctor appears to consider that the health point of view is summed-up in carbon monoxide. It is not. The increasing use of gas, whatever be the content of carbon monoxide, has a greater beneficial effect upon health than the doctor has apparently even conceived, though from the professional standpoint it ought to have appealed to him long ago. Gas employed for lighting can be made the vehicle for improved room ventilation; and the use of gas for heating has a remarkable effect not only upon domestic economy and efficiency, but upon the sanitary conditions of our atmosphere. As a medical man, Dr. Laird must know that a smoke-laden atmosphere, or a pall of smoke over our cities and towns, is not a condition that contributes to the health of the people. More harm is done through the solid and chemical emanations from the domestic coal grate and the industrial boiler or furnace than carbon monoxide in gas has ever been guilty of. The doctor would be doing great service to the people, and possibly a disservice to the purses of medical practitioners, if he took up arms against the coal grate. Electricity cannot displace coal to any extent for heating purposes, owing to its prohibitive cost; gas has displaced an enormous quantity of coal, and is doing so day by day. The medical men of London, Bournemouth, and elsewhere are very large patrons of gas for heating purposes. Their views are manifestly not those of Dr. Laird. For both lighting and heating efficiency, carbon monoxide is a valuable constituent of that gas.

We should also like to point out to Dr. Laird that, if all he says is true about leaky gas-pipes in Macclesfield, and if this condition applied throughout the country, then the evil effects have not their witness in general health statistics. We ask, too, why is it that our men, brought up in homes in which lighting and cooking have been accomplished by gas from their birth onwards, were capable of such noble achievements in a war which shook the very foundations of the world? They ought, judging from the doctor's statement, to have been physically incapable of doing this. And remember, water gas—blue and carburetted—in the same proportions as those employed to-day has been used for the past three or four decades in town gas. When contrasted with larger experience, the puny arguments of Dr. Laird are reduced to almost invisible specks. Really, if this medical man's assertions were true, he ought to have made a huge fortune out of the people of Macclesfield before this. We take it that as a medical man, he knows of a good many perfectly healthy people who use gas in Macclesfield. If he does not, he has been severely restricting his observations. He asserts that there are hundreds of gas leakages in the town, and that there are defective pipes all over it This is very indefinite assertion. But though this, according to the doctor, is the condition of things—hypothetical rather than real we imagine—he informs us that during the last twelve months he has attended "three" people in the town whose sickness he "believes" was due to the inhalation of gas escaping in their houses. He only "believes;" he is not sure. Has any one ever had from a professional man more damning evidence than this against his own theories? Instead of three cases, his own declaration as to leaky gas-pipes all over the town, assures us that he ought to have had many hundreds of cases. The last returns relating to statutory gas undertakings show us that there are 9231 gas consumers in Macclesfield; if we utilize the common multiplier of five, those consumers represent a population of approximately 46,155. Dr. Laird's three cases of sickness caused (he "believes," but does not know) by carbon monoxide look very thin against the population served by gas. We take it that in the houses where the three sick persons lived, other people resided. Why were they not affected by the same escape of gas? Carbon monoxide does not select its victims. In the houses of these people, the gas was not at fault; the fault was that of the people who allowed the leakages to exist. Had they called in a gasfitter or reported the leakage to the Gas Department, they would have saved the doctor's bill—assuming the doctor is correct in his "belief."

We will not go farther into Dr. Laird's mass of indefiniteness which constitutes all the argument he is able to advance for a reduction of the carbon monoxide content of gas. We advise him to look beyond his little experience, and ask himself why it is that, with the millions of people who use gas in this country, there is such general good health; and why it is that carbon monoxide is not making more work generally for the members of his profession and for the undertakers. There is room for much more common sense in dealing with this subject—common sense which has regard for the nearly 8,000,000 consumers of gas in Great Britain, for the 232,602,789,000 c.ft. of gas consumed in 1922, and for the relationship of that vast business to Dr. Laird's feeble arguments. It may interest him to know that last year, in factories alone, there were 309 electrical accidents, and seventeen fatalities—ten of them at voltages of 250 and below. But our case is so strong against the doctor's futile one, that we need not make much of this comparison. There is greater work for him to do than playing on the carbon monoxide string, and that is to do all possible to aid in the economical production of gas, and to assist in abating the pernicious results of the use of bituminous fuel for heating.

Maltby Colliery Relief.

The dire straits in which 22 women and 57 children find themselves as a result of the disastrous gob fire explosion in the Maltby Main workings on July 28, cannot fail to appeal to the hearts of all. Calamity overtook brave men working to make the pit safe for their fellows; and the attempts at rescue after the explosion added a proud chapter to our history. We commend to our readers the appeal published on p. 589 of this issue.

National Gas Exhibition, Historical Section.

Organization and preparation for the Exhibition at Birmingham, from Sept. 17 to Oct. 3, proceed apace. A section is to be devoted to the history of the gas industry; and the Executive Committee are anxious that this shall be as complete and interesting as possible. Special arrangements will be made to safeguard articles of value loaned for the purpose. The letter on the matter which we have received from the Hon. Secretary, Mr. R. J. Rogers, is published in our "Correspondence" to-day.

Expenditure on Coal Control.

We wonder whether the total cost of coal control during the war and subsequently will ever be known to the taxpayers—that is to say, the direct costs without reckoning those indirect losses that fell upon industries through insufficiency of supply and unsuitability to purpose of the coal delivered. In a report by the Committee on Public Accounts, which was issued a few days ago, a number of items are given which total to £43,500,000. These items refer to disbursements since 1918; and they are: Coal Mines Control Agreement (Confirmation) Act, 1918: Estimated deficiency under the pooling arrangement by which the owners receive their pre-war standard of profits, £7,100,000. Coal Mines (Emergency) Acts, 1920 and 1921: Estimated deficiency under the pooling arrangements under which owners received profits based on their pre-war standard, £23,000,000; increased payments of wages, as recommended by the Sankey Commission in respect of the period Jan. 9, to March 31, 1919, £6,350,000; coal mining industry subvention for temporary assistance during the scaling-down of wages in July, August, and September, 1921, in accordance with the terms of settlement of the dispute, £7,050,000. These items make the £43,500,000. They are additional to the costs incurred prior to 1918.

The Incidence of Unemployment.

When one speaks of industrial slackness and of trade being bad, this does not mean that these conditions are evenly spread over the industries. Some are suffering more than others; and

this is evidenced by the varying degrees of unemployment in the different trades. According to the official statement as to unemployment at July 30 in Great Britain and Northern Ireland, the total number of workpeople registered at the Employment Exchanges was approximately 1,250,000, of whom 936,000 were men, and 223,000 were women; the remainder being boys and girls. At June 25, the total was 1,226,000. Among the principal industries, those in which the decline was most noticeable were the wool textile trades, coal and iron mining, and the iron and steel industry. On the whole, employment was good in the tinplate, steel sheet, jute, and carpet trades; fairly good in coal mining, brick making, coach building, and in certain sections of the metal trades; and fair in the furnishing, tailoring, leather, paper, and printing trades. Some further improvement was reported in brickmaking and building. There was slackness in several of the other large industries. The serious question of unemployment has been receiving the consideration of the Industrial Group in the House of Commons, and has led to correspondence between Sir Allan Smith, K.B.E., M.P., and the Premier. The former has expressed the hope that the Government are now prepared to make a more precise and satisfactory statement of policy than has yet been vouchsafed to the country.

A Disastrous Lock-Out.

A dispute which is having grave effects on industry generally is that with the boilermakers in the shipbuilding trade, which led to their lock-out sixteen weeks ago. This is another of those cases in which there has been refusal to honour a national agreement. The deadlock is complete; and there are no signs of an early settlement. An unfortunate thing is that the dispute has created an automatic cessation of work among members of other Unions who have accepted the overtime and night-shift agreement, and are prepared loyally to abide by its provisions. When, owing to the refusal of the Boilermakers' Society to honour the agreement, the employers decided to lock-out the members of that Union from all federated shipyards, they gave a pledge to the other Unions, who were observing the agreement, that they would continue to employ their members as long as possible. It was hoped then that the dispute would not be of long duration; but a stage has now been reached when it is practically impossible for the employers to find work for the members of other Unions. In a very short time, it is feared, there will be a complete stoppage in the shipbuilding and ship-repairing industry. Although the lock-out actually applies only to the boilermakers, the effect is now being keenly felt throughout the entire industry, and the number of unemployed is four times as great as the original number of locked-out boilermakers. Naturally there is considerable resentment on the part of other Unions, because of the attitude taken up by the Boilermakers' Society.

The Dockers' Strike.

Last week was the seventh of the unofficial strike of London dockers over the reduction of 1s. per day in wages in accordance with the national agreement. But the men are gradually slipping back to work; and, at the time of writing, the total collapse of the strike appears to be imminent. The men remaining out were recently boasting that they could continue their idleness for months on the relief pay being distributed by the Boards of Guardians—principally Poplar and Bermondsey. But the Bermondsey relief payment has not continued on sufficiently attractive terms; and the Poplar Guardians are beginning to feel the drain upon their resources. The latter were distributing their relief on such a grand scale that it constituted an invitation to the men to remain idle. There have been protests from large ratepayers; and it is possible the action of the Poplar Guardians will be submitted to the Courts. Indeed, at a meeting last week of the London Waterside and General Manufacturers Association, Ltd., there was considerable discussion over the matter. An opinion from eminent Counsel as to the law, and the methods which should be adopted to challenge the action of the Guardians, was considered; and it was agreed that legal action should be taken. The same Association passed a resolution deploring the supineness of the Government in not affording really adequate protection to men willing to work, and permitting intimidation of their families. The Government were urged immediately to afford proper protection on the river by naval patrol boats—as during the labour troubles of 1911-12. Similar resolutions regarding intimidation and relief payments were passed at a meeting on Thursday of City merchants, convened by the London Chamber of Commerce. Regarding relief, the resolution called upon the Chamber to initiate amending legislation at the earliest possible moment "to ensure that the law be so administered that no encouragement be given to workers who refuse employment when they are well able to obtain it." Another feature of the week was the issue of a manifesto by the Communist Party, which showed they had been active in keeping the strike alive.

The Dockers' Return.

Since the foregoing paragraph was written, we have learned that the men who were still out on strike decided, on Sunday, to return to work on Tuesday. So ends another of those stupid contests with law and order. From the beginning, the strikers were in the wrong. The strike was unauthorized by the men's Union, and was against a condition of an agreement entered into on their behalf some time ago. They were without the sinews of war; they were unorganized for a contest of this kind; they had leaders whose preference was for something unconstitutional. With their Strike Committee no one would parley; and the Ministry of Labour refused to see them. The whole sympathy of the public was on the side of the employers. Thus collapse was inevitable; and the only sign of wisdom the men have shown throughout the piece has been their decision to return to work. The Chairman of the Committee (Mr. W. M. Turner) claims that the men have won a great victory in the history of trade unionism. Even by the aid of a microscope, other people will not be able to detect this. What the strikers have done is, through their action in declining to comply with the national agreement, to bring disgrace on the *bona fides* of trade unionism. Out of the strike it is understood a new organization has arisen—the Amalgamated Union of Lightermen, Stevedores, and Dockers. We fancy the Transport Workers' Union will continue to hold the reins.

To Oust Non-Unionists.

Last week reference was made to the movement of the Transport Workers' Union and the National Union of Railwaymen to join forces in ousting non-unionists from any participation in work in which their own members are concerned. In our comments, allusion was made to what this portends and to probable effects. The proposed alliance for this purpose was discussed last Saturday at a meeting of delegates of the two Unions. At the conference Mr. W. T. A. Foot presided; and in the course of his remarks he made three significant statements as to the causes which prompted the movement. The first was that it was the direct outcome of what was known as "Black Friday" (the day during the coal strike when the split took place between the Miners' Federation and the Transport and Railwaymen's Unions). The second reason for it was the steps taken during recent years to organize employers. Thirdly, it is thought that the working classes must recognize that, if they are to enjoy a better system of society, they must be prepared to take full control of industry; and they cannot do this until they have a highly efficient organization. That is a selfish proposition. It does not recognize that there are any other interests in industry than that of labour. "Full control" is rather a tall order. There are other people in industry who have a legitimate right to a voice; and they are the people who laid the foundations of industries, and who have supplied the means and the brains to build them up. Other speakers did not go so far as Mr. Foot. They spoke of the elimination of non-unionists; and, in the end, a resolution was passed approving of the joint understanding arrived at by the Executives of the two Unions, and calling upon the Joint Committee "to make effective use of the new machinery in dealing with the problem of the non-unionists in the railway and other transport services."

North British Association of Gas Managers.—The annual meeting of the Association will be held in the Albert Hall, Dunbarton Road, Stirling, on Thursday, Sept. 6, at 10.30, under the Presidency of Mr. J. M. Smith, who will deliver an address. A discussion on the paper read at the spring meeting on "Our Lighting Load" (see "JOURNAL" for April 11, p. 95) will be reopened by short papers by Mr. John Wilson (Motherwell and Wishaw) and Mr. James Bell (Dumbarton). There is also to be a paper by Mr. A. Nisbet (Paisley) on "The Concentration of Ammonia Liquor." In the evening, the members and friends will be entertained at dinner by the Directors of the Stirling Gas Light Company; and an excursion to Crieff is being arranged for the following day (Friday).

PERSONAL.

Mr. John Davis, who has for ten years past been Outdoor Superintendent to the Wakefield Gaslight Company, has been appointed to a similar position with the Sutton (Surrey) Gas Company, where he commences duty on Oct. 1. Mr. Davis, who is a member of the Yorkshire Junior Gas Association, and also of the Committee of the West Riding Section (Manchester District) of the Gas Salesmen's Circle, was, prior to taking up his present work at Wakefield, assistant in the distribution department of the Eastbourne Gas Company.

OBITUARY.

The death has occurred of Mr. Herbert Green, at the age of 67 years. He took an active interest in public affairs, and was Chairman of the Killamarsh Gas Company.

It is with regret that we learn of the death, from heart failure, on the 10th inst., of Mr. George Vials, at the age of 63. Mr. Vials entered the service of the Imperial Continental Gas Association in 1879 as a pupil engineer at Vienna, being made an assistant engineer at that station in 1883, where he was subsequently placed in charge of the Belvedere Works. In 1897 he was transferred to the Association's station at Frankfort-on-Main, where he was placed in charge of the Bockenheim Works. When the Association's establishment there was merged with other local gas interests into the Frankfort Gas Company, he was taken over by the new Company, together with other members of the Association's staff. On the outbreak of war, Mr. Vials was interned at Ruhleben; but early in 1915 he was repatriated to England (having reached the age limit of 55), when he was pensioned by the Association. He obtained a post in the Ministry of Blockade, and rendered material service to the Government. Mr. Vials, who leaves one daughter, will be much missed by all who knew him. The funeral took place at Brompton Cemetery on Monday of last week.

GAS EXAMINATION PRIZE WINNERS.

Awards by the Society of British Gas Industries.

The Secretary of the Society of British Gas Industries (Mr. Arthur L. Griffith) has forwarded the following list of winners of the prizes given by the Society in connection with the City and Guilds of London Institute's Final Examinations in Gas Engineering, Gas Supply, and Gas Fitting. The Pass Lists will be found in the "Journal" for Aug. 8, p. 473.

Gas Engineering.

First Prize, 5 Guineas.

John Grayston, examined at the Municipal College, Burnley.

Second Prize, 2 Guineas.

Norman Hudson, examined at the Central Technical School, Leeds.

Gas Supply.

First Prize, 5 Guineas.

Bertram Walter Taylor, examined at the Municipal Technical School, Birmingham.

Second Prize, 2 Guineas.

William Thos. Newton, examined at Hereford.

Gas Fitting.

First Prize, 5 Guineas.

Alfred Latham, examined at the Municipal Technical School, Birmingham.

Second Prize, 2 Guineas.

George Cooper, examined at the Royal Technical College, Salford.

A Tribute.

"Mr. James W. Helps, then President of the Institution of Gas Engineers, was in 1910 elected an Honorary Member of our Society. A sound engineer, whose counsel was ever welcomed by his colleagues, a man of wide scientific attainments, and one whose pen portrayed the broadness of his views, Mr. James Helps was numbered among our friends. At the International Gas Congress held in Paris during the 1900 Exhibition, he presided, on the proposition of M. Th. Vautier, over one of the early meetings which inspired the later formation of the International Committee on Photometry and the Commission for the Standardization of Screw Threads. At the first meeting of the latter, he was delegated by the Institution of Gas Engineers to carry on this most important work; and up to 1913 he took an active part at all the meetings. In 1905, his brother engineers awarded him the Birmingham Medal—striking and much-coveted testimony of the worth of his work to the British gas industry. Engineer and General Manager of the Croydon Gas Company, to which he devoted 29 years of his life, a well-earned retirement came in 1912. Here once more we extend to our fellow engineers of the Institution of Gas Engineers our warmest sympathy at the loss they have sustained."—The President, M. Robert Ellissen, at the annual meeting of the Société Technique de l'Industrie du Gaz en France.

ELECTRICITY SUPPLY MEMORANDA.

It is difficult to give a reason why supply through an electric slot meter, and a charge of 6d. per unit for electricity, with an estimated percentage added to cover the first cost and maintenance of the installations, can be properly described as "free-wiring" But that is the description given to an experiment that is proposed by the St. Marylebone Borough Council. They are going to make the trial in various blocks of tenements. In the opinion of the Electricity Committee, there is a good field. In all they have 36 properties which are considered suitable for a "free-wiring" scheme. The number of tenements in these varies from 10 to 540—the total number being 2821. But when it is learned that 491 are one-room tenements, no less than 1127 only two-room tenements, 749 three-room tenements, and 454 four-room tenements, the information does not suggest very profitable tenants, compared with the expenditure that will be involved in fitting the equipment (including meters). It is not intended, however, that all these tenements shall be equipped at the initial stage. Difficulties have to be faced. It is not anticipated that the owners will raise any objection to the installation of the electric light; but it appears that they are not prepared themselves to spend the money. They have excellent reasons. Owing to this, staircase lighting will have to be dealt with in the same way as the tenement installations; and the owners, so it is contemplated, will pay towards the cost of the staircase lighting the estimated annual interest and sinking fund contributions. The Committee have, it seems, made a selection of a number of properties for the scheme—supply to be given through slot meters. The initial cost of carrying-out the plans (inclusive of the staircase circuits) is calculated at £5500; and the "possible" revenue, "on a conservative basis," will be "approximately" £1600 per annum. There is a good deal of elasticity about the statement, which binds the Committee to nothing definite in respect of income from this speculation. Shilling-in-the-slot meters are favoured; and consumers are to undertake their own lamp renewals. The work, it is suggested, shall be put up to tender by local contractors. To call a scheme of this kind "free-wiring" is rather misleading; but misleading things sometimes look attractive. Application for the necessary loan is to be made to the Electricity Commissioners.

A "Free-Wiring" Scheme.

What Others Have Done.

The St. Marylebone Electricity Committee, in considering the question of entering upon the scheme referred to in the previous paragraph, took the opportunity of making inquiries to ascertain what other Borough Councils have done in and about London. They found that similar rental wiring schemes have been adopted by Bermondsey, Gravesend, Hackney, Ilford, Poplar, St. Pancras, Walthamstow, and Wimbledon. But—mark this—the majority of these undertakings have only had limited experience with the system. Poplar, however, is an exception with fourteen years' run. The investigations do not seem to have caused the St. Marylebone Committee to speak rapturously of the idea; they simply allude to the results as "favourable." We have looked through the accounts of the Poplar Electricity Department; but we cannot find any specific information relating to the scheme. Apparently it is mixed up with the other items. The Marylebone report states that the Council have had twelve years' experience of the "fixed price per point" system, which is in operation at Crawford Place Dwellings. The Committee, however, are not in favour of an extension of this, as, though for lighting purposes it saves the cost of a meter, it is found that tenants prefer to pay by meter for what is actually used; and, "when heating and cooking are adopted, a meter is required." We cannot imagine that many of these dwellers in tenements require electricity for cooking and heating. Several electrical engineers have confessed that the fixed price per point for lighting is not so profitable as they would like it to be, inasmuch as the users of electric light under that system see to it that they get their money's worth in the way of use of the light—in fact, some electrical engineers aver that the consumers obtain so much in excess that it is better to dispense with their custom in the interests of the undertaking. At one time of day, there was considerable enthusiasm over the cultivation of business on the fixed-price plan. But the schemes seem to have dropped away very much into the shades of the past. Regarding St. Pancras, another report states that the scheme for wiring and lighting small dwellings has become "very popular" there. It was brought into operation in the latter part of 1921; and up to the end of the last financial year, 989 consumers were connected. Since then 72 others have been obtained.

The Commissioners Lose; The Industry Pays.

An unpleasant thing for the Electricity Commissioners is to be reminded that they are supported solely by involuntary contributions. They were established by Act of Parliament; and by the same instrument, the electricity industry has to pay for their upkeep. Of

course, the electricity industry had no right to expect a special central department of its own, without paying for the luxury. But the administrators of electricity undertakings look with knitted brows on the Commissioners when they take to doing things *ultra vires* the provisions of the Electricity (Supply) Act, 1919, and so run the industry into unnecessary expense and extravagance. This is not the purpose for which they were appointed. "Meteor" of the "Electrical Times" thinks the position is Gilbertian; and if a *faux pas* by the Commissioners involves the industry in costs—well, they must concede a smile, however wry. Capt. Edmund Bax, Chairman of the Westminster Electric Supply Corporation, discovered the Gilbertian situation; the apparently impossible has been found possible. One might be pardoned for thinking it impossible for a case to occur in which, while legal costs were awarded to one party, that party should, owing to an anomaly, be compelled to bear not only their own costs but those of the losers. This has actually occurred in the litigation between the London Electric Supply Companies and the Commissioners. The Appeal Court decided against the latter, and awarded the costs of that Court and the Court below in favour of the Companies. These will amount to over £2000; but, owing to the fact that Parliament has decreed that all the expenses of the Electricity Commissioners shall be borne by the electric supply industry, it will have to bear the costs of the litigation in which the Companies were successful. The "Electrician" seems to have more sympathy for the electricity undertakings that were not engaged in the litigation than for the Companies who brought it; and it seems to take a narrow view regarding it. It says that, by winning their case in the Court of Appeal, the London Companies "have settled a point—important or unimportant, according to the point of view. But had they been more amenable to the Commissioners' suggestions in the first place, the matter in dispute need never have been raised. Incidentally, they have shown that to fight the Commissioners is a luxury that has to be paid for; and if other undertakings learn by their experience, the outcome will not have been wholly evil." If the "Electrician" had been willing or capable of examining the matter with a more liberal mind, it would have considered first the question as to why the Companies should have been more amenable to the Commissioners' suggestions, if these were inimical to their interests. The Companies were within their rights. Secondly, our contemporary would have asked itself why the Companies should remain quiescent when they believed the Commissioners were exceeding the powers Parliament conferred upon them, and which belief the Court of Appeal has said is correct. They have done a real service to the electricity industry, by showing the Commissioners that their powers have limits. Had they not done this, goodness only knows what the Commissioners might not at some time have tried to thrust on the industry. It was just as well this action was taken, before anything worse occurred. The Companies have proved that the Commissioners did something which they had no right to do; and the lesson will have a salutary effect. Therefore we regard as foolish the statement quoted above. It is no more a luxury to fight the Commissioners than to fight other people; it is a commonsense thing to do, to set the Commissioners in their right place if they attempt to clamber outside it.

Defects or Difficulties.

For years there has been an outpouring of reproach on the electricity supply industry for its inefficiency on the domestic sales side of its business. Week after week the attack is made in the electrical journals or at some meeting. There is no end to it. But with it all, though here and there an outburst of new energy is witnessed, it has no lasting effect. There should be an inquiry into the matter, to get at its roots. Causes should be discovered, and then things might go on better, and to the greater satisfaction of the critics. We often wonder whether these critics would, if they had the chance, really do any better than the men in possession of the jobs, or whether the same fate that befalls the latter would also overtake the former. We are inclined to think it would. Just look at things in the light of past events. What has happened in many cases? A burst of enthusiasm, and a display of energy. New business has come along as a reward; but gradually the business tails off, and drops to the old level. Enthusiasm gets damped, and energy stemmed; and, however great the effort to keep both well up, this becomes unsuccessful with time if the public are not responsive. "Meteor" has, in the "Electrical Times," been having a shot at what he thinks is an inherent defect of the industry. He writes: "The manufacturing and technical efficiency is extraordinarily good; the selling and distribution inside the trade is not so good, but still good. But when it comes to the all-important final stage of inducing the public to electrify on an intensive scale, the industry is palpably inefficient. . . . Ask the most enterprising manufacturer, the most resourceful station engineer, the keenest electrical contractor, the most go-ahead retailer, if the internal conditions of the industry do not hamper or clog his efforts to build-up new business. The answer in every case will be 'Yes.' Ask him if the defects are incurable; and he will answer 'No.'" Then why are they not cured? Domestic electrification has been before the electricity industry for the past quarter of a century. If the defects are curable, men and ways would ere this have been found capable of achieving what is desired. But are they really curable inherent defects, or incurable inherent difficulties?

Electricity Appropriation.

Recently instances have been given of the fancy that has taken hold of some men for obtaining electricity by various devices which provide for the by-passing of their meters. They have been successful; the inspectors of the electricity purveyors have been equally so, with the result that magistrates have had an opportunity of expressing their views on the subject, and extracting very justly more from the pockets of the wrong-doers than the value of the electricity stolen. It was reported at a recent meeting of the West Ham Corporation that two summonses had been taken out against Mr. G. Steel for making an unauthorized connection with the electrical installation from the rear of one house to the main power fuses at the rear of another house. He pleaded guilty, and a fine of 15s. was imposed on each summons. Mr. Steel ought to regard himself as very lucky.

Electrical Accidents at Ordinary Voltages.

Incorporated in the annual report of the Chief Inspector of Factories and Workshops is that of the Senior Electrical Inspector (Mr. G. S. Ram). This document is always interesting. It deals very largely with electrical accidents—fatal and otherwise—that occur in factories and workshops. The number of accidents reported during 1922 was 309, including 17 fatal cases—five more than in 1921. We will not refer here to the accidents on high-pressure or extra-high pressure systems, except to say that many of them appear to have been due to negligence—such as omitting to open isolating switches before working on switchboards. Even skilled persons have met with their deaths through working close to unscreened live conductors. But turning to the medium-pressure and low-pressure accidents, ten fatal cases, it is seen, were due to shock from alternating current at 250 volts or less, as against none from direct current. This is wholly in accord with the experience of previous years. Two of the fatalities were due to the use of ordinary metal lampholders, unearthed, as portable lamps; another to an unearthed pendant lamp fitting. One fatality indicates a risk not generally appreciated, and shows how small a contact may be sufficient to produce death. A man working in the pit of a garage had broken the lamp he was using; and in attempting to remove the broken base of the lamp from the lampholder, the live leading-in wires of the lamp touched the palm of his hand, causing the muscles to contract, so that he was unable to let go. He called out to his mate to switch-off the current; but he succumbed, in spite of artificial respiration carried on for two hours. In a general classification of the accidents, among the items it is noticed that 48 (five fatal) occurred from the use of portable apparatus.

Lessons from the Report.

Throughout the report emphasis is laid upon alternating current being responsible for an increase in the number of fatalities. We meet this again where mention is made of a contributory cause of a number of low-pressure accidents, including several fatal cases during the last few years, having been due to the single-pole switch in the circuit for lighting or for portable apparatus being connected in the wrong wire. This matter, it is said, is of increasing importance in view of the extending use of alternating current, and particularly where direct-current distribution is being changed over to alternating. Such systems usually have an earthed neutral conductor—*e.g.*, in the case of four-wire, three-phase distribution, the lighting circuits being taken from one phase and the neutral. Many wiring contractors connect the single-pole switches at random in whichever wire happens to be most convenient, with the result that, even in otherwise good installations, many of the switches are found to be in the neutral conductor, with the result that the full pressure is maintained in the circuit, including the lamp fittings, or portable apparatus, whether the switch is on or off. This practice is prohibited by the regulations, but has been difficult to detect in the course of ordinary inspection without the use of a portable voltmeter. Recently an instrument—a so-called "pocket electroscope"—has, it is stated, been put on the market by means of which wrong connections can be readily detected. Some contractors have already supplied these instruments for the use of their wiremen, mainly for this purpose. They are, however, useful for other tests—for example, for the detection of live switch covers; but, being very sensitive to small leakages, they require using with intelligence.

Shock Fatalities.

The report also emphasizes the importance of attempting to restore persons rendered insensible by electric shock by means of artificial respiration, applied immediately, and continued for an hour or two if necessary. The importance, it is said, is still not realized in many works, even in public-supply stations. In three of the fatal high-tension accidents, the injuries from burns were so severe that artificial respiration was impracticable. In the fourth case, it was carried on for twenty minutes, and in the ambulance for about ten minutes longer, until the patient reached the infirmary. In the low-tension cases, it was applied in two instances for over two hours; in one for one-and-a-half hours; in another for three-quarters of an hour; in four cases, for a few minutes only; and in two it was not attempted. In one case, in the test room of a large electrical manu-

facturing works, where (the report says) one would expect efficiency in this matter, it was applied for one minute until an attendant arrived from the ambulance room, pronounced the patient dead, and proceeded to tie up his jaw. On the other hand, artificial respiration was successful in several instances. In five cases of high-tension shocks, the patients came round in thirty (two cases), fifteen, ten, and four minutes respectively; and in cases of low-pressure shocks, in forty-five, twenty, and ten minutes; and in four others "in a few minutes." There is no doubt, Mr. Scott Ram remarks, that, in the course of a year, many electrical workers receive electric shocks of more or less severity, particularly from low-pressure circuits, but which do not cause them to be absent from work for more than one whole day. Such accidents are not reportable, even though the victim may have been rendered insensible. The records of successful application of artificial respiration are, therefore, very incomplete; but they show that many persons have been so restored, some after periods of insensibility of over one hour, and even two hours. It is, however, unfortunately true that many cases, particularly from alternating low-pressure circuits, have terminated fatally even where artificial respiration has been applied apparently promptly and skilfully. The question naturally arises whether any other form of treatment for persons rendered insensible from electric shock is available either in supplementing, or in substitution for, artificial respiration. It appears to be established that electric shock may cause death by paralysis of the respiratory centre, or by arresting the proper action of the heart, and putting it into a state of "fibrillation." The latter result appears to be readily brought about by alternating current low-pressure shocks. In the case of the former, artificial respiration is accepted by the medical profession as the proper treatment; but it appears that no successful treatment has been discovered for dealing with the heart when once fibrillation has been set up. In connection with this matter, Mr. Scott Ram has been struck by the fact that in cases where a man has received a severe and prolonged shock, and has then had a bad fall, if he escapes fatal injuries from the latter, he recovers from the shock. The report mentions known cases of this.

THE NEW BELFAST HOLDER.

This photograph, which has been forwarded to us through the good offices of Mr. James D. Smith, shows the progress made (since the Institution's visit to Belfast two months ago) with the seven million c.ft. spiral-guided holder at the Belfast Corporation Gas-Works, Ormeau Road. The new purifier house in the foreground, and the background of the photograph give a very fine idea of the immensity of the structure, which at the time of taking was filled with air for testing purposes. It is expected to take the holder into commission for gas storage in a few weeks' time.

The "Beaumont" Vibra-Jig Coke Screen.

There have recently been installed at the works of the Consolidated Gas, Electric Light, and Power Company of Baltimore five "Beaumont" vibra-jig coke screens, designed to remove breeze before the coke goes to the generators. As described by Mr. H. N. Lowenthal, in the "Gas Age-Record," the screen consists of two punched screen plates (that receiving the coke being directly above the other), with open ends, set in a horizontal plane, supported by steel spring legs which are inclined towards the back or charging ends of the screens. The lower ends of the spring legs are securely bolted to a solid cast-iron base. The screens are vibrated by means of a single eccentric shaft and four eccentric rods, two for each screen. The shaft is mounted at the back of the screens, and on the same base as that on which the spring legs are mounted. The eccentric shaft is so journalled that the forward stroke of the one screen is the backward stroke of the other. Therefore the forces required in imparting the strokes are counterbalanced one by the other, and in perfect rigidity, without causing vibration of the apparatus. The spring legs are so designed that their period of vibration, or "twang," is in tune with the number of strokes by the eccentric shaft. Due to the upward and forward movement of the screens, the larger and heavier portions are thrown upwards through the mass of material, leaving the fines down on the screen plate to be dropped through. Therefore the entire surface of the screen plate is available to receive the fines. There is practically no grinding action during the process of screening, as the larger pieces of material are most of the time floating in the air, and are not in contact with the screen plate. It is possible to make an intermediate separation, as in the top plate there are larger holes than in the lower plate. Owing to the "floating" action of the material, its motion forward is comparatively rapid, and large capacities are obtained. Both power consumption and the number of wearing parts are at a minimum.

Iron and Steel Institute.—The papers which are expected to be read at the autumn meeting of the Iron and Steel Institute number fifteen, and the titles give promise of much matter of interest to the members. The meeting is to be held in the Chamber of Commerce, Milan, on Monday and Tuesday, Sept. 17 and 18, and is to be followed by visits to Florence, Rome, Piombino, Leghorn, Genoa, and Turin.

Industrial Oxygen.—We recently received from the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., of No. 52, Grosvenor Gardens, S.W. 1, a handsomely-bound reprint of the first of the "Transactions of the Institution of Chemical Engineers," which sets out the results of an investigation undertaken by the Company into the possibilities of obtaining cheap oxygen. Extracts from this valuable paper by Mr. T. Campbell Finlayson, B.Sc., were published in the "JOURNAL" for June 20 (p. 737).

SOME NOTES ON THE EDUCATION SCHEME.

By WALTER HOLE.

IT is already becoming apparent that one of the difficulties the Education Scheme will have to face in the near future is the terrible dearth of teachers. This is not because the ranks of the industry does not contain them; there are plenty of qualified men, fully capable of undertaking this duty.

Where, then, the difficulty? Business life to-day has become so exacting—the pace has increased so greatly, and appears to get faster and fiercer every year. The right kind of man for this duty is usually one whose grit, determination, and ability have led him to undertake serious study for himself; and this, again, has paved the way to responsible office. The man in responsible office naturally feels some reluctance to undertake additional tasks, in view of the business conditions of to-day. While allowing all weight to such considerations, there is the future of the industry to consider, too. Is it, therefore, too much to appeal to every qualified man, if any call should come his way, to accept it, if at all possible, and make the self-sacrifice involved a contribution to the future of the industry he is proud to serve? Inevitably, when the Education Scheme has been in operation for a few years, it will grow its own teachers; but for the next year or two the difficulty is evidently going to be a very serious one.

Some months ago, a letter was sent out by the Institution to all chairmen, directors, and committees of gas undertakings appealing for facilities for study to be granted to all their employees likely to profit by such. There is no information as to what extent this request has been, or will be, granted; but one hopes it may (and there are indications that it will) be very widely conceded. The payment of the travelling expenses of members of Junior Associations in attending their meetings, which has now become almost general, indicates that undertakings are adopting a considerate view of such questions.

The granting of facilities is very closely associated with the bestowal of suitable rewards to successful students. The Gas Light and Coke Company have for years encouraged their employees in this way; so also have the Reading Gas Company. It is good to find, in going about the country, that other undertakings are following so splendid a lead in this direction. One of the most elaborate, best thought-out, and complete schemes which the writer has yet come across is that of the Birmingham Corporation Gas Department, of which, by the courtesy of Mr. A. W. Smith (the Secretary and General Manager), it is possible to give the following account.

CLERICAL STAFF EMPLOYEES.

Chartered Institute of Secretaries.

The scheme under this heading is divided into three parts; the first being that to any member of the staff who joins the classes held in the Municipal School of Commerce for Book-keeping and Accountancy, Commercial Arithmetic, Commercial and Company Law, Secretarial Work and Practice, the school fees shall be returned providing the student has made 90 p.ct. of the possible attendances in respect of the two subjects.

The second, or intermediate, portion provides for the award of a prize to the value of £1 1s. in respect of each of the above subjects in which a member of the staff obtains 75 p.ct. of the total marks awarded in the advanced section of the tests held by the Municipal School of Commerce at the end of each session, together with a return of the school fees.

For the final part of the scheme, the examination held by the Chartered Institute of Secretaries, which entitles an individual to become an Associate Member of the Institute, has been selected, and an advance in salary of £15 per annum is granted to any member of the staff who successfully passes this test.

The scheme, as a whole, aims at encouraging members of the staff, particularly the younger men, to take-up a definite and progressive course of study. With this object in view, the subjects chosen in the first and second stages are selected with the intention of making the final stage easier of accomplishment, in order that the financial benefit shall be obtained.

Gas Engineering and Gas Supply.

Each staff employee who successfully passes the final examination of the City and Guilds of London Institute in either of the above subjects, is awarded an increase in his salary of £5 per annum.

WEEKLY WAGE EMPLOYEES AND ALL OTHER THAN STAFF EMPLOYEES.

Gas Engineering and Gas Supply.

Any employee under this heading who successfully passes the final examination of the City and Guilds of London Institute in either of the above subjects is awarded an increase of 2s. per week in his wages. In the event of any of the above employees passing Grade I. in these examinations, the Gas Committee award him a gratuity of £1.

Gas-Fitting Classes.

Special classes are held at the City of Birmingham Technical School for gasfitters and gasfitters' assistants. To those gasfitters who successfully pass the Final Grade Examination in Gasfitting, City and Guilds of London Institute, the Gas Committee award a wage increase of 2s. a week. The classes for gasfitters' assistants are also arranged by the Gas Department, who prepare the syllabus and conduct the classes in conjunction with the City Educational Authorities, whereby the gasfitters' assistants in the employ of the Gas Department receive a good theoretical and practical education from 14 to 21 years of age. Examinations are held in the various subjects each year; and the Gas Committee award to the successful students instruments or book prizes, also a certificate of proficiency.

The teachers for these classes are Gas Department employees. The Gas Committee pay the teachers' fees, and also the students' fees for attending the classes. A record of each student's progress through the various classes is entered on an "Educational Record Card," and filed for reference in the department.

Such a scheme as the above deserves the widest publicity, and is well worthy of imitation by those undertakings which have not yet adopted any scheme for the encouragement in technical training of the members of their staffs.

THE INSTITUTION SCHEME.

One of the problems connected with the inauguration of such an Educational Scheme as that of the Institution, is that of reaching those, who, for want of a better term, may be referred to as the Junior Juniors. These are the youths of 16 to 21 years of age, or more, who are just coming into the industry, and are at the right age for educational effort, but who have not yet attained the dignity of membership of one of the Junior Associations. How can these be reached, and influenced to take advantage of the opportunities the scheme affords? They belong to no Association which could be assembled to consider the scheme together. Simply to post-up a list of the classes to be held in the neighbourhood, is felt to be quite inadequate. Much may be done by a kindly word of encouragement from "the Chief." Much, again, may be accomplished by the direct influence of the members of Junior Associations upon the still more junior members of their staffs. It is gratifying to know that many of them are realizing this, and acting accordingly. The London and Southern District Junior Gas Association are issuing a very general invitation to all interested to attend a meeting to consider the scheme, to be held at the Westminster Technical Institute on Sept. 7—an example which it is hoped will be widely copied.

Notwithstanding the many explanations which have been given, and the footnote added to the recently printed copies of the scheme, there still appears some confusion as to the relation of the old City and Guilds of London Institute Certificates and those to be granted under the Educational Scheme of the Institution. It may therefore be well to repeat once again:

(*a*) That the standard of attainment required for the Higher Certificate under the Institution's scheme will be approximately equal to that of the Final Certificate under the City and Guilds.

(*b*) That for the purpose of preparing the way for higher examinations, during a transitional period of five years the Ordinary Grade Certificate of the City and Guilds will be considered equivalent to the Ordinary Certificate of the Institution, and a First-Class Final City and Guilds Certificate as equivalent to the Higher Certificate of the Institution.

(*c*) That there will be no exchange of the Institution's Certificate for one of the City and Guilds.

(*d*) That candidates for the Diploma Examination must possess First-Class Honours Certificates in both Gas Engineering and Gas Supply of the City and Guilds.

(*e*) Any person wishing to sit for the Diploma Examination, and, while possessing all other qualifications, is uncertain as to whether his general educational attainments are up to the required standard, should apply to the Secretary of the Institution for one of the "Application Forms" which are now being printed, and will shortly be available. On the return of these, duly filled in, the Advisory Committee will consider each case on its merits. The exact wording of the clause dealing with this requirement is as follows:

> Entrance to this examination shall be restricted to those .... who have passed the Matriculation Examination of any recognized British University, *or possess the Higher School Certificate A or B, or have attained such other educational qualifications of not lower standard, or pursued such course of studies, as may subsequently be recommended by the Advisory Committee* and agreed upon by the Council of the Institution of Gas Engineers and the Board of Education concerned.

The impression seems to be very general that it is the Matriculation Certificate, and that only, which counts.

A Gas-Works Tipping Truck.—Included in the present issue of "Engineering" are detail drawings and a description of a tipping wagon, with special provision to resist heavy shocks on the bearings, designed by Dr. Charles Carpenter and Mr. T. S. F. Gibson, for use at the East Greenwich Works of the South Metropolitan Gas Company, and constructed at the works under the superintendence of Mr. T. Curr, the Resident Engineer. The track throughout the works is of standard gauge; but some parts of it are not adapted for ordinary rolling stock, because of the small radius of some curves. The truck described is intended for use in these parts of the system.

FACTORS INFLUENCING THE YIELD OF AMMONIA IN THE CARBONIZATION OF COAL.

PART II.*—DISSOCIATION, THE INFLUENCE OF WATER VAPOUR AND THE CHARACTER OF THE CONTACT MATERIALS.

By R. A. MOTT, M.Sc., and H. J. HODSMAN, M.B.E., M.Sc., F.I.C., Department of Coal Gas and Fuel Industries, Leeds University.

[A Paper read before the Yorkshire Section, Society of Chemical Industry, on Nov. 20, 1922—reproduced from the Society's "Journal."]

(*Continued from p.* 531.)

DISSOCIATION OF AMMONIA IN HYDROGEN (FREE FROM OXYGEN).

Absence of oxygen was ensured by passing the hydrogen through a tube containing platinized asbestos heated in a bath of sulphur vapour. It was found that even at 200° C. the oxygen had reacted completely with the hydrogen.

Experiments were performed with mixtures of hydrogen and ammonia containing about 1·5 p.ct. of ammonia at varying temperatures. The results are given in Table III. and graphed in fig. 2 (p. 531). It is seen that the hydrogen curve follows the dry coal gas curve very closely, the dissociation being slightly less. The closeness and similarity of the curves are evidence in favour of the phenomenon in both cases being one of dissociation, which in both series begins to be measurable about 650° C., and is complete slightly above 800° C. The range of temperature, 150°, is small, and the curves do not support Foxwell's statement that the reaction is one of which the velocity increases only slowly with temperature. The "chattered" firebrick is an active catalyst, in contact with which the reaction velocity of the dissociation of ammonia increases rapidly with temperature. Velocity constants have been calculated at the different temperatures employed, from the equation of a bi-molecular reaction

$$k = \frac{1}{t}\left(\frac{1}{a-x} - \frac{1}{a}\right)$$

where t = actual time of contact, a = initial partial pressure of ammonia in mm. Hg, and $a - x$ = final partial pressure of the ammonia in mm. Hg. They have been included in Table III., and show a very rapid increase with temperature, k_{T+10}/k_T exceeding 3.

TABLE III.—*Experiments with "Chattered" Firebrick. Dissociation of Ammonia in Hydrogen.*

Temp. °C.	Rate of Flow (Litres per Hr.).	Time of Contact, Secs. (Calc. to 500° C.).	P.Ct. NH_3 Entering.	P.Ct. NH_3 Leaving.	P.Ct. NH_3 Dissociated.	P.Ct. NH_3 Dissociated Calc. to Same Time of Contact.	P.Ct. H_2O Entering.	Velocity Constant k.
650	3·14	7·25	1·645	1·61	2	*Nil*	*Nil*	0·00033
660	2·52	9·05	2·10	1·89	10	*Nil*	*Nil*	0·00080
675	3·36	6·8	2·05	1·92	6	3	*Nil*	0·00074
680	2·80	8·15	1·50	1·21	19	2·5	*Nil*	0·0032
750	3·36	6·75	2·03	1·38	32	29·5	*Nil*	0·0059
795	5·66	4·0	1·08	0·41	62	87	*Nil*	0·069
795	3·53	6·45	1·79	0·33	81·5	82	*Nil*	0·070
800	3·52	6·45	2·255	0·30	87	87·5	*Nil*	0·081
750	3·20	6·95	2·06	1·69	18	13·5	3·2	—
850	4·82	4·75	1·24	0·37	70	87·5	2·9	—
850	3·28	6·9	2·45	0·32	87	83	3·1	—

Effect of Water Vapour.—A few experiments were performed with hydrogen containing about 3 p.ct. of water vapour; and the results (Table III., fig. 2) again show the inhibiting effect of water vapour on the dissociation. The results for moist hydrogen and moist coal gas practically coincide, and one curve (No. 2) is shown for the two series of results.

DECOMPOSITION OF AMMONIA IN A NITROGEN ATMOSPHERE.

To find the effect of small amounts of oxygen on the decomposition of ammonia in a non-reducing atmosphere, experiments were performed using as the diluent nitrogen containing a small proportion of oxygen (1·2 p.ct.). In some experiments the oxygen was removed by passing the gas through a porcelain tube containing a roll of copper gauze heated to redness. The gas was tested before and after the experiment to ensure complete absence of oxygen. After each experiment, any copper oxide formed was reduced by passing a stream of hydrogen over the heated copper gauze. The experiments with a mixture of nitrogen and ammonia containing 1·2 p.ct. of oxygen (sufficient to oxidize all the ammonia in the usual mixture containing 1·5 p.ct. of ammonia) are recorded in Table IV.(*a*) and fig. 2; those with an oxygen-free nitrogen atmosphere are given in Table IV.(*b*) and fig. 2.

The results are notable in two respects. In an atmosphere of dry nitrogen, the ammonia dissociates much more readily than in hydrogen when both are freed from oxygen. The same speed of decomposition can be attained at temperatures about 150° C. lower than the corresponding temperatures in hydrogen. Thus at a temperature of 660° C., at which the ammonia is almost completely decomposed in presence of nitrogen, in hydrogen decomposition is just measurable under otherwise identical conditions. It might be urged that this is supported by the law of mass action, which requires that the percentage of ammonia capable of permanent existence at equilibrium is higher in presence of hydrogen than in nitrogen. This may be valid at or near equilibrium, but is not necessarily true, or even probable, under the conditions of experiment where the influence of the reverse reaction—union of nitrogen and hydrogen—is negligible compared with the direct action of dissociation.

TABLE IV.—(*a*) *Experiments with "Chattered" Firebrick. Decomposition of ammonia in dry nitrogen.*

Temperature °C.	Rate of Flow (Litres per Hour).	Time of Contact, Seconds (Calculated to 500° C.)	Per Cent. NH_3 Entering.	Per Cent. NH_3 Leaving.	Per Cent. NH_3 Decomposed.	Per Cent. NH_3 Decomposed Calculated to Same Time of Contact.
Dissociation of ammonia in nitrogen with 1·2 p.ct. O_2.						
650	3·12	7·3	2·13	0·89	57	53
710	3·11	7·3	1·935	0·51	74	70
760	3·11	7·3	1·675	0·17	90	86
(*b*) *Dissociation of ammonia in nitrogen (oxygen free).*						
450	3·18	7·15	1·75	1·72	2	*Nil*
550	3·32	7·1	1·90	1·76	7·5	1·5
590	3·38	6·75	2·125	1·52	28	25·5
630	3·43	6·65	1·895	1·195	37	35·5
650	3·43	6·65	2·065	0·495	76	74·5
650	3·54	6·45	2·22	0·415	81	81·5

The other remarkable result was the apparently preservative action of a small proportion of oxygen (1·2 p.ct.) at any rate above 650° C. Unfortunately, the experiments were confined to this region. It is difficult to decide upon the mechanism of the decomposition. There is sufficient oxygen present to oxidize the whole of the ammonia, and oxidation occurs freely at a lower range of temperature than dissociation. On the other hand, dissociation, when possible, appears to have a greater temperature coefficient, and the hydrogen set free would react still more rapidly with any oxygen present (Greenwood and Hodsman), while the nature and quantity of the products would be the same as before. There is also the possibility of a preservative action of the water vapour formed. However, the different slope of the curves for nitrogen when containing oxygen and free from it may be significant, and indicate a different mechanism—*i.e.*, that the decomposition in presence of oxygen is one of direct oxidation.

TABLE VI.—*Experiments with Fused Silica. Dissociation of Ammonia in Coal Gas (Oxygen Free).*

Temp. °C.	Rate of Flow (Litres per Hour).	Time of Contact, Seconds (Calculated to 500° C.	P.Ct. NH_3 Entering.	P.Ct. NH_3 Leaving.	P.Ct. NH_3 Dissociated.
800	4·08	5·6	0·95	0·855	10
800	4·10	5·55	1·935	1·95	*Nil*
800	4·10	5·55	2·35	2·315	1·5
905	4·10	5·55	1·37	0·95	30·5
905	4·10	5·55	1·955	1·71	12·5
900	3·94	5·75	1·52	1·30	14·0

Since the dissociation of ammonia is a surface reaction, it would seem to be most profitable to try to explain the difference found between nitrogen and hydrogen curves, by reference to the surface, as mentioned by Greenwood and Hodsman.

EXPERIMENTS WITH COAL GAS FREE FROM OXYGEN.

Coal gas, from the same cylinder of compressed gas as had been previously used, was freed from oxygen by passage over copper gauze in a porcelain tube. The results (Table V. A, fig. 2) again show, at the same temperature, a more extensive decomposition in the absence of oxygen than in its presence. The curves are parallel. Since in the former experiments with coal gas the oxygen was always practically completely removed in the passage through the reaction tube, and this removal had been traced to the reaction with hydrogen to form water, this water presumably exerted an inhibitory effect on the ammonia decomposition.

Effect of Water Vapour.—The effect of adding further amounts of water vapour to the gaseous mixture was tried. Greenwood and Hodsman found that, while added water vapour up to 12 p.ct. of the mixture exerted a specific inhibitory effect on the oxidation of ammonia at 740° C., above 12 p.ct. (fig. 3, curve 4) the decrease in oxidation could be accounted for by dilution and reduced time of contact. The same temperature approximately was chosen in our experiments, and an oxygen-free coal gas was used containing 25 p.ct. of water vapour, and the usual ammonia content. Complete suppression of decomposition was attained (Table V. B,

* Part I. was reproduced in Vol. CLIX. of the "JOURNAL," pp. 527, 595.

TABLE V.—*Experiments with "Chattered" Firebrick. Dissociation of Ammonia in Coal Gas (Oxygen Free).*

—	Temperature °C.	Rate of Flow (Litres per Hour).	Time of Contact, Seconds (Calculated to 500° C.).		P.Ct. NH_3 Entering.	P.Ct. NH_3 Leaving.	P.Ct. NH_3 Dissociated.	P.Ct. H_2O Entering.	P.Ct. NH_3 Dissociated Calculated to 6·5 Seconds.	
			Dry.	Moist.					Moist Gases.	Dry Gases.
				A. Experiments in dry gases.						
1	700	3·86	5·9	—	1·32	1·16	12	*Nil*	—	18
2	760	3·65	6·25	—	1·88	1·07	43	*Nil*	—	45·5
3	775	3·97	5·75	—	1·69	0·29	53	*Nil*	—	60·5
4	785	3·95	5·75	—	1·83	0·67	64	*Nil*	—	71·5
				B. Effect of water vapour.						
1	750	3·98 dry 4·98 moist	5·7	4·55	2·055	2·07	*Nil*	25	*Nil*	—
2	785	3·42 dry 3·84 moist	6·65	5·90	1·96	1·81	8	12·5	14	6·5* 57*
3	850	3·40 dry 3·83 moist	6·7	5·95	1·55	0·63	59	12·5	64·5	—
4	855	3·04 dry 3·81 moist	7·5	6·0	1·46	1·52	*Nil*	25	*Nil*	11·5*
5	855	3·85 dry 4·52 moist	5·95	5·05	1·83	1·72	6	17·5	20·5	83·5*
6	855	3·95 dry 4·07 moist	5·75	5·6	1·41	0·34	76	5·4	85	97*
7	850	4·12 dry 4·25 moist	5·5	5·35	1·53	0·20	87	3·2	98·5	

* These figures have been used in fig. 3.

experiment 1, fig. 3). At a higher temperature (785° C., curve 3) in dry gases, about 72 p.ct. of the ammonia was decomposed, but only about 8 p.ct. with 12·5 p.ct. of water vapour present.

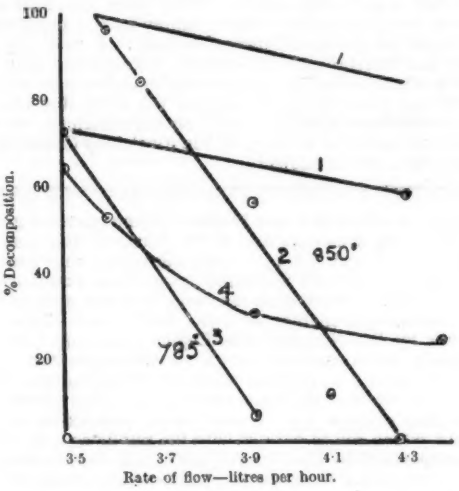

Fig. 3.

1. Effect of reducing time of contact in dry gases.
2. Effect of reducing time of contact by dilution with water vapour at 850° C.
3. Effect of reducing time of contact by dilution with water vapour at 785° C.
4. Effect on oxidation of ammonia of reducing time of contact by dilution with water vapour (Greenwood and Hodsman).

It was then obvious that the effect of water vapour on the dissociation was greater than on the oxidation of ammonia; and in order to try the effect of larger amounts, a temperature of 850° C. was chosen. In dry coal gas, ammonia was completely decomposed 50 p.ct. below this temperature; with 4·8 p.ct. of water vapour (3 p.ct. of water vapour added to coal gas containing 1·2 p.ct. of oxygen, which would give 1·8 p.ct. of water vapour), about 86 p.ct. (curve 2) of the ammonia was decomposed; with 17·5 p.ct. of water vapour in the gas, about 10 p.ct. of the ammonia was decomposed; and 25 p.ct. of water vapour completely inhibited the dissociation. This result was remarkable: 25 p.ct. (*and probably less*) *of water vapour can completely inhibit dissociation at a temperature* 50° *higher than that necessary for complete dissociation in the dry gas.* It seems, however, that the specific protective action of water vapour continues throughout the range explored, and may be observed by comparison with fig. 3, curve 1, showing the decrease in decomposition at 785° C. due to dilution. The curve showing the effect of water vapour on the oxidation of ammonia (Greenwood and Hodsman) is also reproduced (No. 4). These results show well the preservative action of water vapour on ammonia, and how, were it possible to mix all the ammonia produced in carbonization with the steam, the yields might be increased.

The question arises as to the mechanism of the inhibitory action of water vapour, and the reason for the difference in the results of the dissociation of ammonia in atmospheres of nitrogen and hydrogen. The view was expressed in the previous paper (Greenwood and Hodsman) that "the most helpful conception has been obtained from Langmuir's theory of the molecular film on the catalyst surface."

Langmuir contemplates most of such gas reactions as occurring between atoms and molecules adhering to the surface, which is to be regarded as a sort of molecular exchange, the reaction speed being influenced by the kind and disposition of the different particles, and their relative tenacity to the surface. The differences observed when the ammonia is heated in different atmospheres, and the effects traced to water vapour, would find a plausible explanation in this theory. Hydrogen would adhere to the surface more readily than inert nitrogen, and would, by its tenacity, lessen the amount of surface available for ammonia molecules to occupy prior to reacting. This would account for the greater dissociation of ammonia in a nitrogen atmosphere at lower temperatures.

In the experiments with moist gases, it was found necessary to pass the gases through the contact tube before an experiment for a much longer time than with dry gases, to reproduce results. In the light of the Langmuir theory, this would be necessary to attain equilibrium between the rates at which water molecules condense at, or evaporate from, the surface. That the latter may be slow, is shown by the time taken to dry completely a combustion tube for organic analysis. Water would presumably adhere to the surface more readily than (say) hydrogen, and increasing partial pressures of water vapour would cause a greater condensation, leaving less of the surface available for the ammonia molecules. With a large excess of water vapour, the surface would become nearly completely covered, and the catalyst would present an almost inert surface.

Effect of Time of Contact.—Throughout the series, corrections for different times of contact have been applied, which had been obtained by direct measurements in which times of contact were varied in experiments made under otherwise similar conditions at the same temperatures. The series of figures include observations on the effect of time of contact in cases where the amount of dissociation involved is small, as in the 650° series, and also

Effect of Time of Contact.

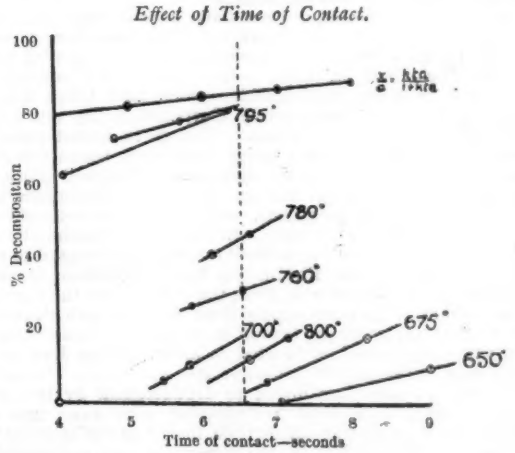

Fig. 4.

where large amounts of dissociation were found, as in the series at 850° C. (fig. 4). The measurements showed approximately the same effect of varying time of contact over the whole range of temperature studied.

The theoretical effect of time of contact with a bimolecular reaction is given in the equation

$$\frac{x}{a} = \frac{kta}{1 + kta}$$

where x/a is the fraction of ammonia decomposed, k is the velocity constant at the temperature in question, t is the time of contact, and a the initial partial pressure of the ammonia in millimetres. The graph of this equation (fig. 4) for the case $k = 0{\cdot}07$, $a = 12$ mm. (at 795°), has a smaller gradient than the curves determined experimentally. The correction has, however, been applied over a small range—usually not more than one second—and seems to be justified under these conditions.

EXPERIMENTS WITH FARNLEY BRICK.

The dissociation of ammonia in coal gas containing 1 to 2 p.ct. of oxygen and in contact with this material was reported by Greenwood and Hodsman. The experiments were repeated, and their results confirmed. On removing the oxygen from the coal gas, a slightly more rapid dissociation of the ammonia was observed, just as with the "chattered" brick. The experimental results are therefore omitted.

Attention may, however, be drawn to the difference between the two brick materials. Thus, at 800° C., under otherwise identical conditions, the ammonia was almost completely destroyed in contact with chattered brick (3·9 p.ct. Fe_2O_3), while 90 p.ct. survived in contact with the Farnley brick (1·5 p.ct. Fe_2O_3). These differ not only in iron content, but probably also in the character of the iron. The iron in the unused Farnley brick is probably mainly in combination with the silicates of the brick, and therefore in a less active condition than the free iron oxide precipitated in the pores of the old coke-oven brick. The possibilities for evil of high iron content of bricks, especially if in the form of free oxide, is thus emphasized.

(*To be concluded.*)

HUDDERSFIELD CORPORATION AND THE ELECTRICAL DISTRIBUTION OF YORKSHIRE, LTD.

[CONTRIBUTED.]

THE Yorkshire Electric Power Company have ramifications over most of the West Riding. For supply purposes they have provided 506 miles of underground and overhead mains, and 208 sub-stations. At the annual meeting in February, it was stated that the Company were now working in conjunction with the principal municipal electricity authorities in their area; agreements having been made with 42 out of 55 undertakings. But they do not appear to get along very well with the Huddersfield Corporation Electricity Undertaking, for the two recently came into keen combat over the question of the powers of supply to certain districts outside the borough of Huddersfield. An inquiry, occupying two days, was held by the Electricity Commissioners; and there was the usual array of statistical and other evidence presented, whereby each of the protagonists sought to prove their capacity for supplying the area under debate at the lowest possible cost. It should be explained that, as the Yorkshire Electric Power Company have only statutory powers to supply for power, or for lighting where power supplies are also taken, they got over their limitations many years ago by bringing into existence Electrical Distribution of Yorkshire, Ltd.—a subsidiary Company which exploit the lighting business, and take the whole of the electric current required from the parent Company. But for all practical purposes, the subsidiary Company are part and parcel of the major Company; the latter fighting the battles of the former with all their technical and other resources, and generally holding the leading strings.

The Huddersfield Corporation have a wide reputation as a thoroughly progressive municipality. They have been pioneers in many things which have contributed to the improved health and amenities, first of their own citizens, and secondly of the citizens in other municipalities which have taken it as an example. But the Huddersfield Corporation are not merely progressive; they are ambitious. Though in recent years the practice of "raiding" outer areas whereby to widen municipal boundaries has received a few ugly shocks, they will endeavour to bring under their wings certain suburban communities when conditions are more propitious, and the unpleasant set-backs become a more distant memory. Among these communities are those which constituted the bone of contention in regard to electricity—viz., Kirkheaton, Kirkburton, Lepton, Meltham, Marsden, and Slaithwaite. Those who guide the destinies of the Corporation know that, if they can supply these districts with electricity, it is a good argument in favour of subsequent incorporation, especially when tacked on to what is already being done by the Corporation in the way of tramways, gas, and water. The whole of the debated areas are linked to Huddersfield by tramways or motor buses, and some are supplied with water and gas. What could be more reasonable, then, than that the electrical requirements should be met by the Corporation also, and especially where the local authorities concerned favour that laudable desire? Alas! The dreams of an extended electricity supply and all that might follow in its train are, for the time being at all events, rudely shattered. The Electricity Commissioners have turned down the Corporation's application, and have favoured that of Electrical Distribution of Yorkshire, Ltd., *née* Yorkshire Electric Power Company. In the letter conveying the decision, the principal factors which have led to it are set out. Among these are: (1) That the granting of an Order to the Corporation would place them in the position of having to compete for power supplies in areas where the Power Company have already laid mains and are giving supplies to power users, who may also, if they choose, use the supply for lighting purposes; (2) competition would involve duplication of high-tension mains, and hence of capital expenditure, which is not in the public interest or to the ultimate interests of the undertakings concerned or of the consumers; (3) having regard to the high proportion which power supplies usually bear to total demand in an area, it appears to the Commissioners that the estimates of the Corporation in respect of the proposed areas of supply would be substantially modified in the event of a proportion only of the power demand being secured by the Corporation at competitive prices. Indeed, it is probable that the supplies in the proposed areas would involve the Corporation in a loss.

There is hearty agreement on the writer's part with the Commissioners' dictum that competition in electrical supply is wasteful. This agreement can be expressed without allying oneself with either the one side or the other in this piquant dispute. But competition of electricity with an existing gas supply is also wasteful, especially where the needs of power and lighting are already satisfactorily met. Meltham, Marsden, and Kirkburton have each an independent gas supply, and have jogged along very well so far without any local outcry for electricity. The gas in Lepton is supplied mainly from Kirkburton, and only four years ago the separate gas undertakings at Kirkheaton and Slaithwaite passed over to the Corporation. The Slaithwaite Council have for several years had an Electricity Order which they have not exercised, mainly because there was no pronounced demand. The truth is that the Corporation of Huddersfield would have been in most of the areas before the war if there had been likelihood of a profitable return. They have been hustled into the present competition for right to supply by the aggressiveness of the Yorkshire Electric Power Company. Perhaps they wish now they had forestalled the assault by negotiating a grip on the debated districts before the Electricity Commissioners came into being—setting potential losses against the asset (for what it is worth) of a stronger municipal hold on the districts. It will be interesting to see if the decision of the Electricity Commissioners is the last word on the subject.

A Large Gas-Engine Power Station.—Some interesting details, photographs, and drawings are to be found in the number of "Engineering" dated the 17th inst., regarding the gas-engine power station of Palmer's Shipbuilding and Iron Company, Ltd., Jarrow-on-Tyne. The station is a large one, and contains seven vertical tandem gas-engines of 1500 B.H.P., and one of 1000 B.H.P., built by the National Gas-Engine Company, Ltd.; each engine being direct coupled to an electric generator. There are also four 1650 B.H.P. single-crank double-acting gas blowing engines, built by Messrs. Galloways, Ltd. The seven 1500 B.H.P. vertical engines run at 200 R.P.M., and drive 6000-volt alternators, which run in parallel with the public supply over the large area operated by the Newcastle Electric Supply Company. The gas is obtained from three blast furnaces, each of which produces about 1,000,000 c.ft. per hour. Of this 450,000 c.ft. of gas per hour per furnace is available for the generation of electricity. The dry gas-cleaning plant is of the Halberg-Beth type (considerably modified as compared with the original German design), constructed at Fraser and Chalmers Engineering Works, Erith. By this method (in which the gas is filtered through cloth bags), the bulk of the potash can be recovered in its original state. The dust content of the cleaned gas is found to average only 0·002 gramme per cubic metre. Actually the gas for the engines is found to be practically 100 p.ct. clean. The dust taken out of the gas amounts to about 50 tons a week.

River Water Purifying Plant at Beckton.—In connection with the visit a few weeks ago of municipal representatives to the Beckton works of the Gas Light and Coke Company, mention was made of the recently installed rapid filtration plant, which purifies large quantities of tidal river water for various uses about the works. The installation is fully described and illustrated in the current issue of the "Engineer," where it is remarked that it is, without doubt, one of the biggest installations yet put down for this particular purpose. It was designed and constructed by United Water Softeners, Ltd., of Imperial House, Kingsway, W.C., and is capable of dealing with 4 million gallons of Thames water daily. The water to be treated is raised from the river by four centrifugal pumps by the Worthington Company, arranged beneath one of the Company's piers. These pumps are placed at nearly half-tide level, so that at full tide they are entirely submerged, while at extreme low tide there is a maximum suction lift of about 14 ft. On delivery, a definite portion of the incoming water passes into an automatic measuring apparatus of the Lassen and Hjört type, which is fitted with a chemical container and a chemical mixing valve so adjusted as to release the exact quantity of lime necessary to coagulate and precipitate the suspended and siliceous matter contained in Thames water at Beckton. The sedimentation basins hold approximately 600,000 gallons, thus allowing a period of nearly four hours for reaction and sedimentation when the plant is working at its full output.

LOW-TEMPERATURE CARBONIZATION IN VERTICAL RETORTS.*

The Fuel Research Board, in their report for the years 1920-21, second section,† dealt with the experimental and technical developments of the low-temperature carbonization of bituminous coal during the previous few years; and this report showed that there was much to be done in the direction of cheapening the process before it could be considered a commercial possibility on a large scale. The idea of using some form of vertical retort for low-temperature carbonization is an attractive one, if only because it is a method of obtaining mechanically-operated continuous working, with the consequent saving in labour costs. [Readers will remember the detailed description of the Marshall-Easton process, published in the "JOURNAL" for June 13, p. 667.] H.M. Fuel Research Station at East Greenwich being equipped with a set of four Glover-West vertical retorts, capable of a throughput of ten tons of coal a day, and provided with facilities for measuring the temperatures at different points in the plant, and the quantities and qualities of the various products yielded, it was thought that useful experience could be gained by experiments in carbonization at low temperatures. Research was accordingly carried out on these lines, with the objects of gaining information and of assisting in the design of retorts more adapted to the process, the erection of which was in contemplation. The new retorts have been completed; and results will be published in due course.

PRELIMINARY TRIALS.

A series of preliminary trials was made to determine the best working conditions of temperature, throughput, and size and nature of coal. Owing to the relatively low rate of conductivity of heat through silica brick, higher combustion-chamber temperatures than are needed when iron is the conducting medium were necessary. A test was carried out with Ellistown Main coal (in the form of nuts) with combustion-chamber temperatures between 800° and 900° C.; and after carbonization the pieces showed no signs of fusion. With a view to the production of larger pieces of coke, Durham gas coal was added. The combustion-chamber temperatures were gradually raised till, at 950° C., the coke contained about 9 p.ct. of volatile matter, and when burned in an open grate gave satisfactory results. With 2 p.ct. of steam passing into the retorts, the following were the approximate yields per ton of coal obtained with a throughput of 3·15 tons per retort per day: Coke, 14·2 cwt.; gas 7790 c.ft. (45 therms); tar, 13·3 gallons; sulphate of ammonia, 18 lbs.

At this stage it was decided to use for further experiments Ellistown Main and Mitchell Main coals, a half-and-half mixture of which had been found suitable for the manufacture of coke cakes in horizontal retorts. With a carbonizing temperature of 1000° C., the uncrushed coal gave good results; but a disintegrated mixture formed a hard crust which passed slowly down the walls of the retort and allowed partially carbonized coal to pass more rapidly down the centre. After some trials it was found that a carbonizing temperature of 770° to 850° C. in the combustion chambers gave, with 7 p.ct. steam and about 2 tons throughput, a good strong coke containing 7 p.ct. of volatile matter. At 1·5 tons throughput the volatiles were reduced to 3 p.ct. It was found that an increase in the proportion of Mitchell Main coal to 60 p.ct. gave a more coherent coke, and that it was necessary to supply 9 p.ct. of steam to prevent the coke from taking fire when discharged. To overcome this difficulty, the position of the steam inlets was altered, so that the steam had to pass through the coke in the chamber before entering the retort. This was more satisfactory, and resulted in gas of higher calorific value with similar consumptions of steam. For example, with 7 p.ct. steam an increase was observed from 590 to 660 B.Th.U. per c.ft.

RESULTS OF CARBONIZATION.

The tests were carried out as described in the report on "Steaming in Vertical Retorts" [Report of the Fuel Research Board for the years 1920-21, first section]. Weight balances of the products were prepared as follows:

Weight Balances.

Test No.	1.	2.	3.	4.	1.	2.	3.	4.
Steam p.ct.	*Nil*	7·24	13·47	20·00	*Nil*	7·24	13·47	20·00
Coal . . lbs.	62,503	41,762	17,853	18,011	98·8	91·1	86·3	81 7
Steam . . ,,	—	3,023	2,405	3,602	—	6·6	11·6	16·4
Scrubber water ,,	795	1,046	429	421	1·2	2·3	2·1	1·9
	63,298	45,831	20,687	22,034	100·0			
Coke . . ,,	44,259	30,252	12,755	12,896	69·8	66·1	61·6	58·5
Gas . . ,,	8,831	5,170	2,447	2,562	14·0	11·3	11 8	12·1
Tar, dry . . ,,	3,781	2,816	1,284	1,422	6·0	6·1	6·2	6·5
Liquor . . ,,	8,543	7,523	3,774	4,420	13·5	16·4	18·3	20·0
Loss . . ,,	−2,116	70	427	634	−3·3	0 1	2·1	2·9
	63,298	45,831	20,687	22,034	100·0			

In the test with no steam, this balance shows a gain of over 3 p.ct., which is due to indrawn air. The high yield and low calorific value of the gas made are further indications of this influx of air. With 7½ p.ct. of steam the loss is about 0·2 p.ct., while with higher steaming the losses rise to over 2 p.ct., probably due to outward leakage of condensed steam.

Thermal balances have also been worked out in terms of the heat units available in the products of carbonization compared with those available in the coal charged and the steam added. These are shown below:

Thermal Balance of Products (P.Ct. of Heat Units Added).

Test No.	1.	2.	3.	4.
Coal	100·00	99·35	98·85	98·3
Steam	*Nil*	0·65	1·15	1·7
	100·0			
Coke	71·8	73·9	70·8	71·2
Gas	16·4	15·8	17·0	17·3
Tar	8·1	8·8	9·4	10·2
Loss	3·7	1·5	2·8	1·3
	100·0			

The coke produced was in the form of large conglomerate masses firmly fused together. The original shape of the pieces of Ellistown Main coal could be distinguished firmly fixed into fused and swollen portions representing the Mitchell Main coal. The size varied up to 10-in. lumps, and the whole yield contained about 25 p.ct. of breeze. This latter quantity, it is stated, could have been reduced by altering the method of extraction so as to reduce the grinding action of the worm, and also by decreasing the height of fall from the retort into the coke chamber. A study of the larger pieces of coke extracted showed that the coal charge had travelled down the retort with little mixing action. If it had been possible to prevent the steady flow and to cause a certain amount of mixing, an improvement would almost certainly have resulted in the quality of the coke and the rate of carbonization. The effect of increased steaming was to reduce the amount of breeze formed; this being due to the alteration of temperature distribution on the centre line of the retort.

The analyses of the various cokes made, and the amount of breeze in each are shown below. The volatile matter (*less* moisture) in each decreases only slightly with increased steaming.

Test No.	1.	2.	3.	4.
Steam, p.ct.	*Nil*	7·24	13·47	20·00
Breeze, p.ct.	24·8	22·6	21·8	20·8
Proximate analysis:				
Moisture	0·6	1·4	1·7	1·5
Volatile matter (*less* moisture)	7·0	6 8	7·2	6.3
Fixed carbon	79·0	81 1	78·9	80·1
Ash	13·4	10·7	12·2	12 1
	100·0			
Calorific value, B.Th.U. per lb.	12,670	12,960	12,660	12,700

The gas made varied from 671 B.Th.U. per c.ft. with 7·5 p.ct. steam to 640 B.Th.U. with 20 p.ct. steam. The figure for no steam should have been of the order of 700 B.Th.U.; but the reduction in calorific value is due to air leakage. The yields in each test are set out in the following table:

Test No.	1.	2.	3.	4.
Steam, p.ct.	*Nil*	7·24	13 47	20·00
Gas made per ton of coal, c.ft.	7190	6700	7350	7750
Gas made per ton of coal, therms	46·0	45·0	48·5	49·6
Gas made, calorific value—				
B.Th.U. per c.ft.—gross	640·0	671·0	661·0	640·0
net	585·0	602·0	594·0	573·0
Gas in therms as p.ct. of therms in coal	16·5	16·0	17·2	17·7
Analysis.				
CO_2	4·9	5·6	5·6	7·2
C_nH_m	4·7	5·0	4 8	4·5
O_2	0·2	0·2	0·2	0·2
CO	11·2	8·5	9·7	10·0
H_2	32·2	35·5	37·6	38·0
C_nH_{2n+2}	33·0	33·4	33·0	32·5
N_2	13·8	11 8	9·1	7·6
	100			

The tar obtained was similar in composition to ordinary low-temperature coal tar; and the yield varied from 12·7 gallons with no steam to 16·6 gallons with 20 p.ct. steam. The yields of ammonium sulphate were exceptionally high. Special measurements were made of the distribution of temperature in the coal charge. These have been expressed graphically, and indicate the effect on the temperature zones of the addition of steam.

There are no tables showing the thermal efficiency of car-

* Fuel Research Board, Technical Paper No. 7—Preliminary Experiments in the Low-Temperature Carbonization of Coal in Vertical Retorts. Published by H.M. Stationery Office, Imperial House, Kingsway, W.C. 2. Price 9d., by post 10d.

† Report of the Board for 1920-21. Second section: "Low-Temperature Carbonization." Published by H.M. Stationery Office. Price 2s. net.

bonization in any of the tests, which, after all, is of the greatest importance. And it seems to us that the effects of steaming at such low temperatures will be to lower the thermal efficiency of the process and to increase working costs. Referring for a moment to the tests made at Uddingston by the Gas Investigation Committee in 1920, though increased steaming raised the efficiency of gas production, the efficiency of carbonization was lowered. And as in the case of low-temperature carbonization the factor of most import is the efficiency of the carbonization process, it is difficult to understand the necessity for steaming except in view of the structural defects of the Glover-West high-temperature retort as applied to a process for which it was not designed. However, it is expressly stated in the report of the Fuel Research Board that it must be borne in mind that the retorts used were designed for high-temperature carbonization. With steel or iron retorts, where the rate of heat transference would be much more rapid, and in all probability a lower combustion-chamber temperature could be employed, the conditions would be much more favourable to good working. It would seem, therefore, that a setting of somewhat similar construction, but with iron retorts, would be a possible method of manufacturing a good smokeless fuel by the carbonization of coal at low temperatures. The work in the report is essentially of a preliminary nature, and does not profess to provide a solution of the problem of economic low-temperature carbonization.

Carbon-Monoxide Determination.

Messrs. R. R. Sayers (Chief Surgeon) and W. P. Yant (Assistant Chemist), of the United States Bureau of Mines, have developed a simple apparatus for the qualitative and quantitative determination of the carbon monoxide that has been absorbed by a person's blood. For the purpose of making an estimation, a small puncture is made with a hæmopast in the tip of the patient's finger; and by holding the end of the capillary stem of a pipette in the bead of blood, the capillary is filled by gentle suction. In case the blood does not flow freely, a piece of rubber tubing is wrapped around the finger to force it out. When the capillary has been filled with blood to a point indicated, the tip is inserted into a bottle of water, and sufficient water drawn into the pipette by suction to produce the proper dilution. This diluted blood is then discharged into a miniature test tube. A small quantity of an equal mixture of tannic and pyrogallic acid is then added to the blood solution in the test tube, and the whole mixture agitated. It is then allowed to stand for about ten minutes at room temperature, when it is compared with the standards provided, by interposing it between them, and finding the standard which it most nearly matches in red tint, and then estimating the percentage of carbon-monoxide hæmoglobin from the value of the standard. The apparatus, in a wooden case, fits easily into the average coat pocket. It requires no unusual skill for its manipulation, is inexpensive, and is stated to compare in accuracy very favourably with the more elaborate spectro-photometric apparatus.

Gold Refining by Gas.

Mr. J. E. Bullard tells the readers of the "Gas Age-Record" that Providence is believed to be the largest jewelry centre in the world. In that city there are upwards of 300 manufacturing jewellers and silversmiths, ranging in size from the little plant employing less than 25 men, to a very large one giving work to some 2500 persons. The investment in the industry at Providence is estimated at $50,000,000, and the average annual value of the output at $40,000,000. The case of one firm of gold refiners is quoted, in which gas has replaced coke; the main consumers being three refining furnaces. When coke was used, the crucible was surrounded by a bed of burning coke; and the fire had to be given frequent attention. Every few days the ashes had to be gone over thoroughly for pieces of fuel; and when a sufficient amount had accumulated, these ashes had to be put through a refining process to recover what gold had been lost in them. With these furnaces, it is not a case of feeding-in ingots, but small pieces; and a heat under perfect control is highly desirable. Gas burners provide a good oxidizing flame, with the result that the work can be done somewhat faster than was the case with coke. The heat is also under more perfect control; and after removing a crucible, it is not necessary to re-make a bed of fuel before replacing it. The furnaces can also be heated-up very much more rapidly than they could be with coke. Gas has proved itself a fuel on which the greatest possible reliance can be placed; and it makes it easier and quicker to turn-out work of a uniform quality. There are so many factors entering into this class of work, that it is not easy to make an accurate comparison of the cost of gas with the cost of doing the work with coke; but the firm referred to are convinced that a man in this line of business gets a better return for the time and money he puts in if he uses gas.

In the issue of "Engineering" for Aug. 10, reference is made to the coal-washing investigations at present being conducted by the Department of the Interior at the North-West Experiment Station of the Bureau of Mines, Seattle. In this research, a careful study has been made of the float and sink test as applied to fine sizes of coal. Methods and apparatus have been developed and successfully applied to coal ranging in size from 20-mesh to finer than 300-mesh.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Historical Section of the National Gas Exhibition.

SIR,—I shall be much obliged if you can make an appeal in your next issue regarding the above section, which it is intended to make a prominent feature of the forthcoming exhibition. A number of articles which were loaned for the 1913 exhibition have already been promised; while in addition many other interesting and valuable historical relics of the industry will be displayed—including valuable Murdoch relics which the Public Libraries Committee of the Birmingham Corporation have offered to place at the disposal of the Executive Committee.

Will any gas undertakings or individuals who may have articles of value from an historical point in connection with the industry place them at the disposal of the Executive Committee for the period of the exhibition? Special arrangements are being made as regards this section for the safety of all exhibits. Wherever possible they will be under glass, and will be guarded night and day. Insurance policies will be issued covering all exhibits, from the time they leave the owners' hands until their safe return.

All bodies and individuals who can assist the Executive Committee by the loan of historical exhibits are asked to communicate at once with the Hon. Secretary, National Gas Exhibition, Gas Department, Council House, Birmingham, giving full descriptions of the items for catalogue purposes, and also stating the nominal value which they place on same, in order that arrangements may be made for insurance.

Gas Department, Council House, Birmingham, Aug. 20, 1923.

R. J. ROGERS,
Hon. Secretary.

The Gas Industry and Unemployment Relief.

SIR,—It seems to me that you have overlooked, or at any rate you do not mention in your editorial (p. 521), the "general conditions upon which grants may be approved," and which are printed on the back of the forms sent out by the Unemployment Grants Committee to enable a preliminary statement of works to be submitted.

Are there any firms who would offer to take contracts for the supply and erection of new gas-works plant with such conditions attached? I am sure many gas engineers would be interested to have an answer.

Gas-Works, Chesterfield, Aug. 17, 1923.

H. DAVIES,
Engineer and Manager.

[A copy of the "General Conditions" sent out by the Unemployment Grants Committee has not come our way, so there has been no opportunity of perusing them. It often happens that Government "help" for industries has some snag behind it, which spoils its effective application. Perhaps some of our gas plant manufacturing firms will answer Mr. Davies' question.—ED. G.J.]

REGISTER OF PATENTS.

Vertical Retort for the Distillation of Brown Coal, &c.—No. 190,019.

SCHAEFER & CO., G.M.B.H., of Düsseldorf.

No. 12,177; May 1, 1922.

Convention date: Dec. 7, 1921.

This invention relates to a retort for distilling bituminous materials in thin layers, while facilitating the removal of the vapours formed—seeking to avoid the repeated condensation and distillation of the hydrocarbons which, with other disadvantages, is attributed to cylindrical retorts.

The patentees claim:

1. A distillation retort in which the distillation chamber is formed between two walls enclosing a relatively narrow space for the reception of the material to be distilled, and bounded laterally by venetian-blind-like gratings for the escape of the vapours, characterized by the fact that the retort is divided into several compartments by venetian-blind-like gratings enclosing in pairs a space for collecting the vapours.

2. That when distillation is effected by means of steam, this is also led into a space which is bounded laterally by venetian-blind-like gratings in such a manner that the vapours take a horizontal direction.

3. That between two collectors for the vapours of distillation, gratings are placed in pairs for the introduction of steam or inert gases.

4. A retort as above characterized by the fact that the venetian-blind-like gratings are removable.

Continuous Treatment of Tar or Oils, and Cracking of Residuals.—No. 200,933.

WILTON, T. O., of Hendon, N.W.

No. 11,486; April 24, 1922. (Patent of addition to No. 127,700 of May 28, 1918.)

This invention relates to the dehydration, distillation, and cracking of tar or oil, and is a modification of patent No. 127,700. In this was described a method of effecting continuous dehydration and distillation, characterized in that the liquids to be treated pass through a series of coils at certain pressures and heated to given temperatures; the pressures being suddenly released in the expansion chambers

attached to each coil, whereby the volatilization of the lighter constituents is produced, the heavier constituents passing on for further treatment under similar conditions. The apparatus was described, with an illustration as to a method of distillation in which two steps were used.

According to the present invention, the residuals from the distillation carried out according to the above process are cracked, giving a lower percentage of solid matter and a correspondingly bigger yield of oils of distillation, which are more stable than oils usually obtained by distillation.

In the process described in patent No. 127,700, it is stated that the temperature of the second coil should be 230° to 300° C. In order to obtain the cracking of the residuals, a higher temperature is necessary —namely, 350° C. or higher. To obtain this increase of temperature, the two coils are placed side by side instead of concentrically. This also facilitates their renewal; the life of the second coil being somewhat shortened by the use of the higher temperature. This is the only modification to be made to the plant.

As an example, tar normally yielding 42 p.ct. of pitch when distilled by the previous process, when treated according to this invention yielded only from 19·5 to 20·8 p.ct. of pitch, with a larger yield of creosote oil.

The following is the result of one operation carried out with 31,892 gallons of tar, the temperature of the first coil being 170° to 185° C. and that of the second coil being 356° to 366° C.

Naphtha	6,891 gallons	..	21·6 p.ct.
Middle oils	19,423 ,,	..	60·9 ,,
Creosote	902·7 ,,	..	2·8 ,,
Pitch residue . . .	—		14·7 ,,
			100·0 p.ct.

When treating mineral oil or horizontal-retort tar, the temperature in the last coil would need to be about 362° to 400° C., according to the class of oil or tar that is to be cracked; and in the case of mineral oil it may be necessary to use more than two steps to achieve the required result. It would not be practicable, for instance, to build a coil large enough to deal with the cracking of a crude oil 75 p.ct. of the lighter constituents of which are to be distilled off, especially if the second step involved a large amount of cracking.

Doors for Retort Ovens.—No. 200,941.

MÜLLER, H., of Munich.

No. 11,970; April 28, 1922.

This invention relates to doors for retort and like ovens, and seeks to avoid distortion, planing of the seating, and expensive repairs, and to ensure gas-tightness by simple means.

The structure comprises an air-tight riveted and welded frame composed of two channel-iron members with a strengthening plate between. On this there is screwed gas-tight, but removably and exchangeably, a frame of channel iron made up of two straight sides and two semi-circular yokes. Upon the free limb of the channel iron is an inclined face extending all round the frame. Against this elliptical frame presses the concave door, which has a bevelled rim of wrought iron, strengthened by an angle iron and a pair of longitudinal H-section girders; the pressure being applied by means of an eccentrically mounted lever. By the bevel and the elliptical shape of door and frame, the former is caused to bear perfectly tightly against its seat. In order to permit regulation of the pressure, the pin which the lever engages is adjustable by means of screw-thread and nut. It will be understood that if the door is to engage into the rim with a wedge action, the bevel is inverted; the rim of the frame being outwardly flared.

Differential Meters.—No. 200,985.

HODGSON, L., of Leighton Buzzard.

No. 15,139; May 30, 1922.

In gaseous or liquid meters which are based upon the measurement of a differential pressure, various methods—such as the use of a float and a U tube containing mercury, liquid-sealed bells, and spring-controlled diaphragms—are employed to obtain a movement depending upon the differential pressure.

The present invention relates more especially to the method of installing a flexible diaphragm in such a way that the pointer or pen arm, or other external part which is moved by the differential pressure, may be made to give any desired movement for any given applied differential pressure, and so that when once the instrument is adjusted the diaphragm may be removed or replaced without disturbing the adjustment of the meter; the term "flexible diaphragm" signifying a diaphragm which requires but a small and practically negligible force to deflect it within the limits of the working range. The invention also comprises various methods of protecting the diaphragm when the pressures are being turned on or off, and the diaphragm chamber is being freed from air or condensate.

In the instrument which is the subject of this specification, the flexible diaphragm is preferably clamped between vertical flanges in a chamber; and the higher pressure is admitted to one side of the diaphragm, and the lower pressure to the other side. In the simplest form of the instrument, the diaphragm is provided with a centre plate carrying a hook on the downstream side, and on the upstream side with a plate (containing a slot which has a face parallel to the plane of the diaphragm, and which is the point of actuation of the pen mechanism) which terminates in a hook. The diaphragm is held in position between two tension springs, which are attached to the hooks on the centre plate, and to corresponding hooks fixed to the walls of the chamber. The four hooks to which the two tension springs are attached lie on a line which passes through the centre of the diaphragm, and which is at right angles to its plane. Provision is made for securing the anchors of the springs after the upstream and downstream castings have been bolted together.

The diaphragm is placed vertically to facilitate the removal from the upstream and downstream chambers of air in the case of a steam or water meter (in which cases the diaphragm chambers should be completely filled with water) or condensed moisture in the case of gaseous meters (in which case the diaphragm chambers should be completely free from liquid).

The springs on the upstream and downstream sides of the diaphragm are preferably arranged to be in a condition of stress under all working conditions, and also when there is no differential pressure, so that backlash in the spring anchors is taken out before any differential pressure is applied.

The specification is long, and describes in detail the construction of the instrument.

Furnaces for Heating Hollow Cylinders.—No. 201,013.

WOODALL, DUCKHAM, & JONES (1920), LTD., and DUCKHAM, Sir A. M'D., both of Grosvenor Gardens, S.W. 1.

No. 18,478; July 5, 1922.

The heating of hollow cylinders of considerable diameter, whether for their heat-treatment, for enamelling them, or for any other purpose, presents difficulties both in respect of handling them and of heating them economically and uniformly. According to this invention, a furnace for heating such cylinders is constructed as an annular muffle furnace, the bottom of which is adapted to be lowered from the furnace to receive the cylinder and to be raised again so as to introduce the cylinder into the annular muffle chamber. By constructing this chamber of radius suitably selected with reference to the radius of the cylinder to be heated, the latter may be heated equally both internally and externally by the heated walls of the chamber. Moreover, while the method of introducing objects into a furnace by placing them on a furnace bottom capable of being raised and lowered is known, more particularly in the present instance it permits the introduction and withdrawal of the cylinder with certainty that it will not come into contact with the walls of the annular chamber—operations difficult to perform if the cylinder is lowered into the chamber.

The annular chamber is surrounded by vertical flues so arranged that combustion occurs on the inner or outer side, or on both sides, of the annulus. Preheating flues are also arranged contiguous with waste gas flues. The gas and air flues are so arranged that each pair terminates in a vertical combustion flue on the inside of the annulus. Combustion takes place at the top of the chamber, and the products of combustion descend the combustion flues. At the bottom of these they find an exit into waste-heat flues, of which there is one between each pair of air and gas flues. From the top of these the products pass through radial flues over the top of the chamber to descend corresponding vertical waste-heat flues on the outside of the annulus, thereby serving to heat the air-preheating flues.

The annular chamber is preferably extended somewhat below the brickwork setting by flanges of suitable annular plates, so that when the movable bottom (constructed as an annular trough) is in place, a sealing medium such as sand or liquid may close the chamber from access of air. The bottom is conveniently supported on four rams capable of being raised and lowered hydraulically or otherwise. For instance, when the weight to be carried by the bottom is not considerable, the rams may be constructed as racks and operated by pinions driven by an electric motor through suitable reducing gear. The raising and lowering mechanism may be below a railway track on which the chamber bottom may be brought into position.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Aug. 15.]

Nos. 20,053 to 20,502.

BEILBY, Sir G. T.—"Hydrogenation of hydrocarbon oils and residues." No. 20,185.

IMRAY, O. Y.—"Manufacture of coke and of gas therefrom." No. 20,131.

KNIGHT, E. O.—"Burner fittings for gas-ovens, &c." No. 20,262.

KNIGHT, J.—See Knight, E. O. No. 20,262.

LEE, T. J.—"Cocks and taps for gas." No. 20,059.

NAAMLOOZE VENNOOTSCHAP SILICA EN OVENBOUW MAATSCHAPPIJ.—See Imray, O. Y. No. 20,131.

PAGE, E.—See Lee, T. J. No. 20,059.

SCOTT, T.—"Gas-saver." No. 20,432.

Gas Prices Reduced at Goole.—The Goole Urban Council Gas Committee have decided that the price of gas be further reduced by 9d. per 1000 c.ft., which will bring the charge down to 3s. 9d. This is the third reduction which has taken place since October, when gas cost 5s. 3d. per 1000 c.ft.

Barnsley Gas Supply.—The Directors of the Barnsley Gas Company, in their annual report, state that for the year ended June last the revenue amounted to £69,103. This included sales of gas, £54,117; rent of meters, £828; public lighting, £474; and residual products, £16,209. The expenditure totalled £58,697. This comprised £20,017 for the manufacture of gas; £8943 for repairs and maintenance; £12,963 for repairs and renewals; £2909 for management; and £1374 for law and Parliamentary charges. There was a credit balance of £10,405 to be placed to the profit and loss account. The Directors recommend that, in addition to the interim dividend paid on March 1, a further dividend on the general capital stock and "F" shares, and 3 p.ct. arrears for 1922 on these, 3 p.ct. on the "C" (preference) shares, and 3½ p.ct. on the "D," "E," and "G" shares be paid on Sept. 1. At a special meeting of the Barnsley Chamber of Commerce, the negotiations between the Corporation and the Gas Company regarding a reduction in the price of gas were discussed; and it was contended that the Chamber had been badly "let down." Ultimately a deputation was appointed to meet the Gas Company, as it was urged that the present cost was a serious handicap to the industries of Barnsley.

MISCELLANEOUS NEWS.

GAS REGULATION ACT APPLICATIONS.

The following further notices have appeared in the "London Gazette" with regard to applications to the Board of Trade for Orders under the Gas Regulation Act.

Dewsbury Corporation.

The maximum price now authorized in respect of the supply of gas by the undertakers is 4s. 6d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 4d. per therm.

Newtown and Llanllwchaiarn Urban District Council.

The maximum price now authorized in respect of the supply of gas by the undertakers is 6s. 10½d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 9d. per therm.

It is also proposed that additional charges per therm should be authorized in respect of gas supplied through a prepayment meter.

AMENDING ORDER.

London County Council.

The Board of Trade give notice that the London County Council have made application, under sub-section (3) of section 1 of the Act, for an Amending Order revising the powers of charging authorized by the Gas Light and Coke Company (Charges) Order, 1921, by reducing the standard price prescribed by that Order.

Any person affected desiring to make representations with regard to the application may do so by letter addressed to the Director of Gas Administration, Board of Trade, Great George Street, S.W. 1, not later than Sept. 21, 1923.

A copy of such representations must at the same time be sent to the London County Council and to the Gas Light and Coke Company.

DECLARATIONS OF CALORIFIC POWER.

Abercarn Urban District Council.—450 B.Th.U. (Sept. 1.)

Abergele Gas, Coke, and Water Company, Ltd.—480 B.Th.U. (Aug. 18.)

Accrington District Gas and Water Board.—450 B.Th.U. (Oct. 1.)

Ashborne Urban District Council.—500 B.Th.U. (Aug. 31.)

Calverley and Horsforth District Gas Company.—500 B.Th.U. (Oct. 1.)

Ilfracombe Gas Company.—475 B.Th.U., in substitution for 425 B.Th.U. (Dec. 17.)

Little Hulton Urban District Council.—500 B.Th.U. (Sept. 1.)

Market Harborough Urban District Council.—480 B.Th.U. (Aug. 31.)

Shepton Mallet Gas Company.—500 B.Th.U. (Oct. 1.)

GAS REGULATION ACT ORDERS.

There have been forwarded by the Director of Gas Administration copies of the following further Orders made by the Board of Trade under section 1 of the Gas Regulation Act.

Abergele Gas, Coke, and Water Company, Ltd.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 19·8d. per therm; and this price shall be substituted for the price of 5s. 5d. per 1000 c.ft. wherever it is mentioned in section 24 (price of gas) of the Abergele Gas Order, 1900.

After the declared date, "therm" shall be substituted for "1000 c.ft." in paragraph (ii.) of Schedule B to the Abergele Gas Order, 1900; and "fifth of a penny" shall be substituted for "penny" wherever it occurs in that paragraph. (Aug. 14.)

Blackrod Gas Company.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 18d. per therm.

The minimum permissible pressure at which gas shall be supplied by the undertakers shall be such as, in any main, or in any pipe laid between the main and the meter having an internal diameter of 2 in. and upwards, to balance a column of water 2 in. in height. Provided that: The foregoing provision shall not apply to those portions of the area of supply of the undertakers known as Station Road and Tanner's Brow, and that portion of the area of supply situate to the south of the junction of Tanner's Brow with Manchester Road, until the expiration of three years from the date of this Order; and during the said period of three years the minimum pressure at which gas shall be supplied by the undertakers within the said areas shall be such as, in any main, or in any pipe laid between the main and the meter having an internal diameter of 2 in. and upwards, to balance a column of water 12-10ths of an inch in height. (Aug. 13.)

Blaenavon Gas and Water Company, Ltd.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 17d. per therm.

Prepayment meter clauses are included. (Aug. 14.)

Brockenhurst Gas Company.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 20·8d. per therm. (Aug. 10.)

Holyhead and North Wales Gas and Water Corporation, Ltd.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 17d. per therm; and this price shall be substituted for the price of 5s. per 1000 c.ft. wherever it is mentioned in section 16 (price of gas) of the Holyhead Gas Order, 1911.

After the declared date, "therm" shall be substituted for "1000 c.ft.," and "fifth of a penny" shall be substituted for "penny" wherever they occur in paragraph (2) of Schedule B to the Holyhead Gas Order, 1911.

Prepayment meter clauses are included. (Aug. 15.)

Holyhead and North Wales Gas and Water Corporation, Ltd. (Llanfairfechan Undertaking).

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 19d. per therm; and this price shall be substituted for 5s. 10d. per 1000 c.ft. wherever it is mentioned in section 19 (price of gas) of the Llanfairfechan and Aber Gas Order, 1893.

After the declared date, "therm" shall be substituted for "1000 c.ft.," and "fifth of a penny" shall be substituted for "penny" wherever they occur in paragraph (ii.) of Schedule B to the Llanfairfechan and Aber Gas Order, 1893. (Aug. 15.)

Holyhead and North Wales Gas and Water Corporation, Ltd. (Llangefni Undertaking).

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 20d. per therm; and this price shall be substituted for 5s. 4d. per 1000 c.ft. wherever it is mentioned in section 16 (price of gas) of the Llangefni Gas Order, 1911.

After the declared date, "therm" shall be substituted for "1000 c.ft.," and "fifth of a penny" shall be substituted for "penny" wherever they occur in paragraph (2) of Schedule B to the Llangefni Gas Order, 1911.

Prepayment meter clauses are included. (Aug. 15.)

Holyhead and North Wales Gas and Water Corporation, Ltd. (Llanrwst Undertaking).

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 20d. per therm; and this price shall be substituted for 5s. 4d. per 1000 c.ft. wherever it is mentioned in section 16 (price of gas) of the Llanrwst Gas Order, 1911.

After the declared date, "therm" shall be substituted for "1000 c.ft.," and "fifth of a penny" shall be substituted for "penny" wherever they occur in paragraph (2) of Schedule B to the Llanrwst Gas Order, 1911.

Prepayment meter clauses are included. (Aug. 15.)

Holyhead and North Wales Gas and Water Corporation, Ltd. (Menai Bridge Undertaking).

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 24d. per therm; and this price shall be substituted for 7s. 6d. per 1000 c.ft. wherever it is mentioned in section 14 (price of gas) of the Menai Bridge Gas Order, 1886.

After the declared date, "therm" shall be substituted for "1000 c.ft.," and "fifth of a penny" shall be substituted for "penny" wherever they occur in paragraph (ii.) of Schedule B to the Menai Bridge Gas Order, 1886. (Aug. 15.)

Holyhead and North Wales Gas and Water Corporation, Ltd. (Penmaenmawr Undertaking).

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 19·6d. per therm; and this price shall be substituted for 6s. 4d. per 1000 c.ft. wherever it is mentioned in section 19 (price of gas) of the Penmaenmawr Gas Order, 1887.

After the declared date, "therm" shall be substituted for "1000 c.ft.," and "fifth of a penny" shall be substituted for "penny" wherever they occur in paragraph (ii.) of Schedule B to the Penmaenmawr Gas Order, 1887. (Aug. 15.)

Holyhead and North Wales Gas and Water Corporation, Ltd. (Pwllheli Undertaking).

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 17d. per therm; and this price shall be substituted for 5s. per 1000 c.ft. wherever it is mentioned in section 16 (price of gas) of the Pwllheli Gas Order, 1911.

After the declared date, "therm" shall be substituted for "1000 c.ft.," and "fifth of a penny" shall be substituted for "penny" wherever they occur in paragraph (2) of Schedule B to the Pwllheli Gas Order, 1911.

Prepayment meter clauses are included. (Aug. 15.)

Leeds Corporation.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 13d. per therm.

Prepayment meter clauses are included. (Aug. 10.)

Shipley Urban District Council.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 14·5d. per therm.

After the declared date, "11·5d. per therm" shall be substituted for "4s. 2d. per 1000 c.ft." in Article II. (application of gas revenue) of the Shipley Order, 1918.

Prepayment meter clauses are included. (Aug. 10.)

Sidmouth Urban District Council.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 17·4d. per therm.

After the declared date, the price of 15d. per therm shall be substituted for the price of 4s. 6d. per 1000 c.ft. mentioned in Article II. (application of gas revenue) of the Sidmouth Order, 1918.

Prepayment meter clauses are included. (Aug. 16.)

LECTURE AT MACCLESFIELD.

Dr. Laird's Attack on Gas.

Following his recent attack on the gas produced at the Macclesfield Gas-Works, Councillor Dr. Laird, M.A., gave an address on its "dangerous and poisonous" qualities, at the Beaconsfield Club.

In his opening remarks he said he desired to prove that the question of the distribution of gas for illuminating and heating purposes must be regarded from the health point of view, as well as from the financial aspect. "The latter," said Dr. Laird, "has no doubt been satisfactorily worked out. The price of gas has been reduced, and benefits have been conferred recently in respect of the free loan of appliances. I am not concerned with this; my object being to explain that gas leakages are inimical to human life. If it is said that Macclesfield gas is poisonous and harmful to life, it must be remembered that a poison is not dangerous unless it gets into the system. If complete combustion were assured, and if there were freedom from leakage, either from defective fittings or from holes in the supply pipes, then it would be reasonable to supply gas containing a goodly percentage of carbon monoxide. But my point is that Macclesfield is an old town. The pipes are old and cannot be relied upon. I know this because I visit many houses in the course of my work, and I have seen cases of illness that I believe may be attributed to the inhalation of gas that has escaped into dwellings."

"I do not profess to know anything about the manufacture of gas except that I am acquainted with the general physical and chemical principles which govern its production. But I want to make it plain that when gas escapes, and is inhaled by human beings, the question then becomes a medical one. Unless those who discuss the matter know something of the elements of human physiology, their remarks are inconsequent. Unfortunately, carbon monoxide forms a very stable compound with the blood. In Macclesfield the percentage of this gas is eighteen. A straight coal gas contains about 7 p.ct.; and this gas, from the health point of view, is obviously much safer than that which contains more than double the quantity. Health authorities state that 6 p.ct. is permissible; but the percentage we have here is far too high to receive the approval of any competent health authority. There are hundreds of gas leakages in the town; there are defective fittings throughout; and heavy motor traffic rumbles over the roads, and imposes a strain which the gas-mains were never intended to withstand. Frequently a main breaks; and, owing to the hardened surface of the roads, the gas finds an outlet in the basements of the houses. It percolates through the dwellings, and leads to sickness. Hence the importance of having the carbon monoxide content as small as possible."

"There is no man who knows more of the practical life of a locality than a medical practitioner working in the district. There is a mill in this town illuminated by gas. To shut-off the gas supply at the end of the day, a man turns a tap at the meter; the taps of the various lights never being touched. This means that during the night the gas between the meter tap and the burners, or at least part of it, diffuses into the atmosphere. A further quantity escapes before a light is applied to the burners. I can produce witnesses who will tell you that more people have to leave their work through indisposition when the gas is used than when it is not. It will be said that the room in the mill is so large that such a slight leakage would be of no account. But minute quantities of carbon monoxide are sufficient to disturb the equilibrium of health; and even if the quantity is very small, it is capable of mischief. A friend of mine recently asked me why it was that people who lived near the gas-works were as healthy as they who lived anywhere else in the town. The reason for this is that there is no carbon monoxide in the air round the gas-works. The strange smells are not due to the gas but to bye-products, some of which have distinctive and unpleasant odours often attributed to the smell of gas. The reason why carbon monoxide is added to coal gas is because it is cheap; but it cannot be expected that a medical man, or anyone else who may be interested in public health, will have any sympathy with such a point of view. To conclude, I advocate a considerable reduction of carbon monoxide in the gas at Macclesfield, the keenest attention to leakages, and periodical and frequent tests of pipes and fittings in public buildings. Leakages should be reported to the gas authorities without delay."

GLASGOW'S CHEMICAL DEPARTMENT.

In his fourth annual report on the Glasgow Gas Committee's Chemical Works Department, Mr. W. A. Walmsley (the Manager) states that the result of the year's work has been very satisfactory. Steady progress has been made all round in the direction of more efficient and more economical working. The reorganization and extension scheme, laid down in 1920, is completed; and all new plant has now come into full operation.

The prices obtainable for sulphate of ammonia have been considerably better than those realized during the financial year 1921-22. This, coupled with reductions in wages and in cost of raw materials used in manufacture, has resulted in a considerable increase in the net revenue obtained from the ammonia products. Tar and tar products prices for the first three or four months remained fairly stationary. Towards the end of September, owing to shortage, markets became stronger and firmer, and prices steadily advanced. During the last six weeks of the financial year, prices fell somewhat, but they still maintain a fairly high level.

The result of these market conditions is shown in the financial statement for the year. After paying all working expenses, &c., and £23,499 for rates and taxes, and interest on the book value of the plant, the net revenue is £275,568. This is an increase of £109,948 as compared with last year, and £30,000 more than would have been received from the contractors on the Arbiter's figure.

NATIONAL GAS EXHIBITION.

Supporting Undertakings.

The following is a list of the undertakings that have already promised to support the forthcoming National Gas Exhibition, which is to be held in Bingley Hall, Birmingham, from Sept. 17 to Oct. 3.

There is not a great deal of time left now, and there are many gas undertakings whose names we should like to be able to add to this number. May we therefore urge those who have not so far done so to intimate without further delay their readiness to support, on the lines suggested by the Executive Committee, this earnest endeavour on behalf of the gas industry? It is intended that this shall be a thoroughly representative exhibition; and the benefit derivable from such a national effort must spread itself through the whole of the industry.

The historical section will add greatly to the interest of the exhibition; and those who are in a position to assist in this connection should note, in our "Correspondence" columns to-day, the appeal of the Hon. Secretary—Mr. R. J. Rogers, Gas Department, Council House, Birmingham.

Atherstone Gas Light and Coke Co.

Birmingham Gas Department
Bristol Gas Company
Bexhill Water and Gas Company
Bromsgrove Gas Light and Coke Co.
Bewdley Gas Company, Ltd.
Brierley Hill District Gas Light Co.
Brecon Gas Company
Barrow-in-Furness Gas Department
Burton-on-Trent Gas Department
Brentford Gas Company
Bournemouth Gas Company
Biddulph Urban District Council
Braintree and Bocking Gas Co., Ltd.
Blandford Gas Company

Chesterfield Gas Department
Cambridge University and Town Gas Light Company
Cradley Heath Gas Company
Coventry Gas Department
Cheltenham Gas Light and Coke Co.
Chester Gas Company

Dudley Gas Light Company
Darlington Gas Department
Devon Gas Association
Desborough Gas Light Co., Ltd.

Exeter Gas Light and Coke Co.
Evesham Gas Department

Gloucester Gas Light Company
Gas Light and Coke Co., London
Goole Gas and Water Department

Halesowen Gas Company
Harrogate Gas Company
Hereford Gas Department
Hinckley Gas Department
Harpenden Gas Company
Hexham Gas Company

Kidderminster Gas Company
Kenilworth Gas Company
Kettering Gas Company

Long Eaton Gas Company
Ledbury Gas, Coal, and Coke Co.
Leicester Gas Department
Lichfield Gas Company
Leamington Priors Gas Company
Liverpool Gas Company
Langley Mill and Heanor Gas Light and Coke Company, Ltd.

Midland Commercial Gas Association
Midland Association of Gas Engineers and Managers
Matlock and District Gas Company
Malvern Gas and Electricity Dept.
Manchester Gas Department
Measham Gas Company
Market Harborough Gas Department

Northampton Gas Light Company
Newcastle-under-Lyme Gas Dept.
Nuneaton Gas Company
Nottingham Gas Department
Newark Gas Company

Ormskirk and District Gas and Electricity Company
Oldbury Gas Department
Oswestry Gas Light and Coke Co.

Redditch Gas Company
Rowley Regis Gas Company
Rugeley Gas Company
Rugby Gas Company
Reading Gas Company
Retford Gas Department

Solihull Gas Company
Smethwick Gas Department
Stourbridge Gas Department
Shrewsbury Gas Light Company
Swansea Gas Light and Coke Co.
South Metropolitan Gas Company
South Suburban Gas Company
Stafford Gas Department
Stratford-on-Avon Gas Department
Sheffield Gas Company
Southampton Gas Light & Coke Co.
Stretford and District Gas Board
Seaham Gas and Lighting Company
Shanklin Gas Company
Sunderland Gas Company

Tamworth Gas Light and Coke Co.

Wem Gas Light and Coke Co., Ltd.
Warwick Gas Company
Wallasey Gas Department
Walker, C. & W., Ltd.
West Bromwich Gas Department
West Hartlepool Gas and Water Co.
Wellingborough Gas Light Co.
Wolverhampton Gas Company
Wellington Gas Company

York Gas Company

Camborne Gas Company, Ltd.—At the annual general meeting of the Company, to be held on Aug. 31, the Directors' report and statement of accounts for the year ended June 30 will be submitted. Owing to the continued industrial depression, which has naturally affected the consumption of gas, the profit earned was slightly less than that of the previous year. The balance standing to the credit of profit and loss account amounts to £1784; and it is recommended that this should be appropriated by declaring a dividend at the rate of 4 p.ct. per annum, which will absorb £575, and by carrying forward £1209.

Corporation Employee's Theft of Meter Money.—At the Longton Borough Police Court last week, Arthur Leese, of Maclagan Street, Stoke, formerly employed as a collector by the Stoke-on-Trent Gas Committee, was charged with stealing from gas-meters the sum of £1 8s. 7d. It was stated that the total amount missing on the defendant's circuit was £54 3s. 6d. Mr. W. R. Eddowes, for the defendant, said his client, like so many other young men, unfortunately had formed companionship with others who had more money than he had. This was the explanation of his present position. There was no question of excessive drinking or gambling. The defendant had not been arrested on a warrant; and probably had it not been for his own action, his theft would not have been discovered for a considerable time. He went to Southampton, and realizing his folly gave himself up to the police. He still had £7 7s. in his possession. He was willing to make restitution so far as he was able, and within two or three days would be in possession of £20 which would be devoted to recouping his defalcations. The Chairman of the Bench (Mr. W. Machin) said he had no doubt that bad company was the explanation of the defendant's conduct. The Bench had made a note of the defendant's promise of restitution, and had decided to fine him £20.

BOURNEMOUTH GAS AND WATER COMPANY.

An Interesting Gathering.

Some notable facts and figures were laid before a meeting last Saturday week, at the Bourne Valley works, presided over by Mr. William Cash (Chairman of the Board of Directors), in connection with the Bournemouth Gas and Water Company's co-partnership scheme.

The Chairman, referring to developments, said the Company were committed to a very big expenditure, probably a quarter-of-a-million, during the next two or three years. They had provisionally arranged the first contract for the new vertical retorts at Poole; and in eighteen months or two years they hoped the works would be in operation. He expressed the opinion that the Company and the Bournemouth consumers ought to congratulate themselves on the fact that present-day prices were but a little over 40 p.ct. higher than pre-war charges. Commenting upon the Committee's report as to the co-partnership scheme, including the fact that the total credited to the co-partners for the past year was £5999 3s. 8d., Mr. Cash said that the bonus (8¼ p.ct.) was one of the largest which had been paid.

A further announcement of interest was that the Directors had decided to present a medal (now being designed) to all their servants who had completed 25 years' service; and this applied to over a hundred men.

Mr. A. W. Rathew presented the Works Committee's report, which showed that the sum of £43 10s. had been handed over to the Boscombe and Cornelia Hospitals; and at the latter a bed had been named "The Gas-Workers' Bed." It was hoped to do the same at Bournemouth.

A number of presentations was made; and there also were awards to the successful candidates in the City and Guilds of London Institute examinations.

It was further made known that the Company had gone to considerable expense in laying-out bowling greens and tennis lawns, and that the General Manager (Mr. P. G. G. Moon) had given a challenge cup for the best bowler.

Probable Extensions at Evesham.—To the Evesham Town Council last week the Gas Manager (Mr. P. H. Fletcher) reported that the supply of gas in the Bengeworth area had been giving him cause for anxiety for a considerable time. It was, he said, becoming impossible to maintain a proper working pressure in some of the streets in this area during the period of maximum demand. It was possible that matters might be improved somewhat by additional mains in some of the streets; but as the building extensions were chiefly in this area, it was certain that before very long the whole matter would require consideration, and it would probably mean a large outlay on mains. Further consideration of the report of the Manager on improvements and extensions at the works was again deferred.

TRADE NOTES.

We were interested to hear from the British Mannesmann Tube Company, Ltd., that they have commenced to manufacture lapwelded steel pipes suitable for all purposes. These are made of any diameter ranging from 14 in. up to 72 in., and with adequate shell thickness to ensure the maximum degree of durability. All pipes are tested by hydraulic pressure; and in an illustrated leaflet forwarded by the firm is a photograph of a lapwelded steel pipe, 54 in. in diameter by 18 ft. long by 1 7/32-in. shell thickness, being tested to 500 lbs. per sq. in. This type of pipe is being supplied for the Thirlmere scheme of the Manchester Corporation.

Portsea Island Gas Light Company.

At the half-yearly meeting to-morrow (Thursday), the Directors will report that the profit and loss account for the six months ended June 30 shows an available balance of £58,470; and they recommend that a dividend be declared for the half-year at the following rates per annum: 13 p.ct. on the "A" and "B" shares; 12 p.ct. on the "C" shares; 10 p.ct. on the "D" and "E" shares; and 5 p.ct. on the 5 p.ct. (maximum) stock, less income-tax, leaving £39,787 to be carried forward. The quantity of gas sold was substantially in excess of the corresponding period of last year. The number of consumers was greater; and a large additional number of hired appliances was issued. Captain F. Edgcombe Hellyer has felt it incumbent upon him to resign his position as a Director, owing to his military duties necessitating a prolonged absence abroad. His decision is specially regretted by the remaining members of the Board, as it severs an intimate family association which extended over very many years, and which has been of inestimable value to the Company. The vacancy on the Board has been filled by the election of Mr. F. E. Beddow, D.Sc., Ph.D. The Directors have long been anxious to make some provision for the employees of the Company in their old age; and they think the time has now arrived when this should, and can, be done. A scheme applicable to the whole of the regular workers, providing a graduated pension based on the period of service with the Company, has accordingly been formulated, the financial provisions of which have been approved by a leading London Actuary. It is proposed that the Company and the employees shall contribute equal amounts, and that the Company, in addition, shall supplement these contributions to the extent necessary to meet the claims of the present employees in respect of their past service. If these proposals are approved, it is recommended that a sum of £20,000 be applied to the scheme out of the profit and loss account. The Directors recommend donations of £100 and £10 10s. to the Portsmouth, Portsea, and Gosport Hospital, and the Portsmouth and Southern Counties Eye and Ear Hospital respectively; and also the distribution during the ensuing winter of 100 tons of coke among the poor resident within the limits of the Company's supply.

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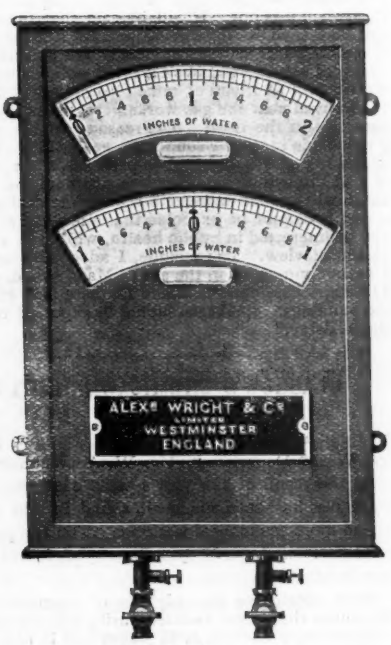

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CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Aug.* 20.

The market for tar products remains quiet, and without material change. Practically no business is reported in pitch, and the price is nominal at about 150s per ton f.o.b. makers' works. Creosote is firm at from 10d. to 10½d. per gallon. Solvent naphtha 95-160 is quiet at about 1s. 10d. per gallon; pure benzole is about 1s. 9d. per gallon, and pure toluole about 2s. 3d. per gallon. Pyridine is in demand; and the price is steady at about 18s. per gallon.

Tar Products in the Provinces.

Aug. 20.

The market for pitch continues very quiet. The absence of buyers on their holidays, coupled with violent fluctuation of the Continental exchanges, has entirely stopped business for the time being; but there appears to be no anxiety on the part of makers on this side, as they are confident that the production of the coming season will be barely sufficient to supply the demand. Creosote oil is still quiet, and there is no alteration in price. Refined products remain easy, and it is very difficult to arrange business. Napthalene is an improving market, and there have been several inquiries lately for pure for near delivery. Carbolic acid is steady, and business is again reported for export. Crystal carbolic is in demand for immediate delivery. For refined tar orders are quiet, and probably the season is nearly at an end.

The average values for gas-works products during last week were: Gas-works coal tar, 80s. to 85s. Pitch, East Coast, 135s. to 140s. f.o.b. West Coast—Manchester, 132s. 6d. to 137s. 6d.; Liverpool, 133s. 6d. to 138s. 6d.; Clyde, 133s. 6d. to 138s. 6d. Benzole 90 p.ct., North, 1s. 2½d. to 1s. 3½d.; crude 65 p.ct. at 120° C., 10d. to 10½d. naked at makers' works; 50-90 p.ct., naked, North, 1s. 7d. to 1s. 7½d. Toluole, naked, North, 1s. 7d. to 1s. 8d. nominal. Coal tar crude naphtha in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 1s. 2½d. to 1s. 4d. Heavy naphtha, North, 1s. 5½d. to 1s. 7½d. Creosote, in bulk, North, liquid, 8d. to 8½d.; salty, 7½d. to 8d.; Scotland, 6¾d. to 7½d. Heavy oils, in bulk, North, 8½d. to 9d. Carbolic acid, 60 p.ct., 3s. 4d. to 3s. 5d. prompt. Naphthalene, £15 to £16; salts, £6 to £8, bags included. Anthracene, "A" quality, 4d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

Altrincham Gas Company's Reduction.—The Altrincham Gas Company are reducing their charge for gas by 2d. per therm, equal to 9d. per 1000 c.ft., as from the meter readings at June last, making the price 3s. per 1000 c.ft., less 5 p.ct.

Southport Gas Price Reduced.

At the monthly meeting of the Southport Town Council on Aug. 14, Councillor R. Wright (Chairman of the Gas Committee) said it had been resolved to reduce the price of gas by 3d. per 1000 c.ft. to ordinary consumers, and in the case of slot meters to give 22 instead of 21 c.ft. for a penny. The price was now 3s. 6d. per 1000 c.ft., which was a reduction of 1s. 6d. in about twelve months. Councillor Wright said he had received a letter from Councillor Owen regarding the cost of collecting revenue from slot meters. There were many other expenses in connection with slot meters besides the collection of coins. A prepayment meter, for example, cost 25s. more than an ordinary one. There was the extra cost of inspection; sometimes a slot meter got full of pennies before the usual time for emptying. Altogether the extra cost came to 7d. per 1000 c.ft. The cost of gas had been 3s. 9d., less 5 p.ct., which reduced it to 3s. 6¾d. At 21 c.ft. for a penny, slot meter consumers had paid 4s. But from the 4s. they had to deduct working expenses, which were 7d. Hence, while from prepayment consumers 3s. 5d. was received for their gas, from the ordinary meter users 3s. 6¾d. was obtained. Councillor Wright also referred to the Committee's proposal to subscribe ten guineas to the fund to commemorate the work of Prof. Arthur Smithells during his association with the Leeds University. Gas Committees throughout the country were esteeming it a privilege to contribute to the fund, and to honour one who had done such splendid work in furthering the interests of the gas industry. Councillor Owen thanked Councillor Wright for his information. In regard to the questions he had asked, it had been stated that the cost of collection was equal to 3d. per 1000 c.ft., but that an additional 4d. was necessary for other purposes. He was inclined to think the latter figure could be reduced or eliminated. He maintained they could give 23 c.ft. for 1d.

Improvements at Newtown.—The Gas Committee reported to a meeting of the Newtown Urban Council last week the receipt of a letter from the Ministry of Health stating that the Council were empowered to borrow £5000 for repairs and improvements at the gas-works. The Committee recommended that application be made to the Board of Trade for an Order empowering the Council to supply gas at 1s. 9d. per therm to ordinary consumers and 1s. 11d. to slot meter users.

Coatbridge Gas Company.—A satisfactory statement of accounts and balance-sheet for the year ended June 30 are submitted by the Directors of the Company. The sales of gas for the twelve months amounted to 1,145,211 therms, which was an increase of 52,198 therms over the previous year. The result of the six months' working to December last, it was felt, justified them in reducing the charge for gas, as from Jan. 1, by a further 1·4d. per therm. The dividends, in accordance with the sliding-scale, are at the rates of £14 5s. p.ct. per annum on the original stock, and £9 19s. 6d. p.ct. per annum on the four issues of £10 shares, all less income-tax.

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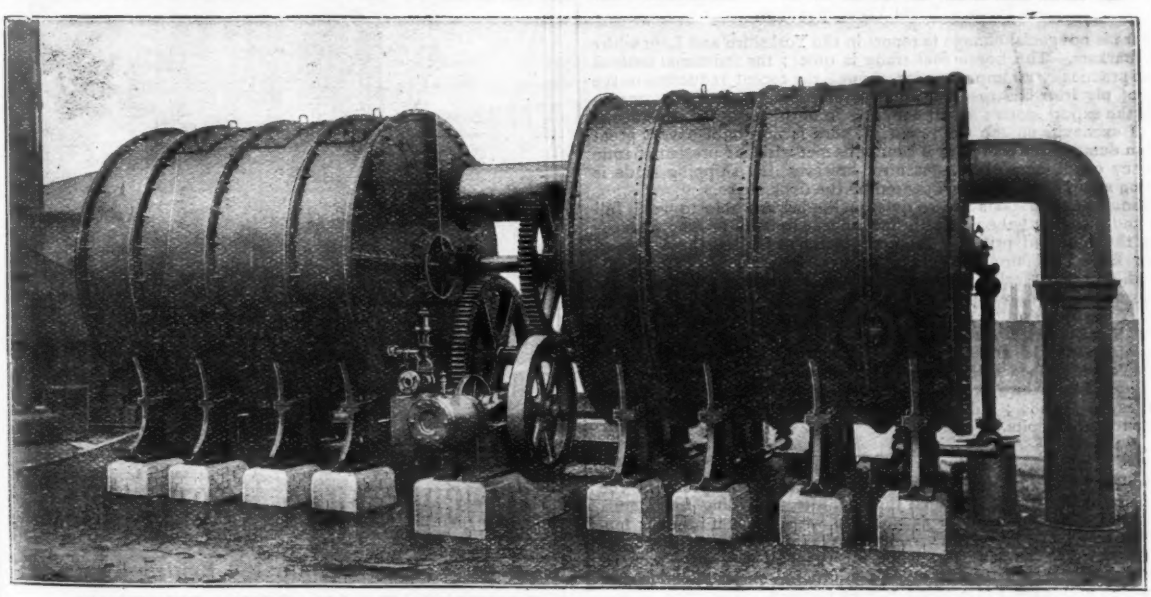

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THE NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

Another gloomy week has passed on this market, practically devoid of business of any kind. Many collieries have experienced idle time, both in Northumberland and Durham, as there is no prompt business offering at all, even at figures below the cost of production. Even those who are reasonably well sold have great difficulty in getting consumers to stem tonnage to take out their regular quantities. The position will not be helped in any way by wages in the near future, as the ascertainments for both counties, based on the more prosperous times of May and June last, show slight increases for September and October. Under the present system, of course, the collieries have the advantage in a rising market, and the men when prices are slumping.

Quite apart from the lack of demand for this and next month, there is an almost complete absence of any serious attempt to buy for forward and for next year. Inquiries circulate from time to time, but fitters hardly consider it worth while quoting, since, however low they make their price, the inquirers always seem to come back with a counter-offer which is quite hopeless; the inference being that they are waiting to see whether prices will slump still lower. It is hard to see how they can go much further at present, when collieries are already offering at cost or under.

Best gas qualities are now quoting at 24s. to 25s. as a basis from which to start negotiations. Most collieries, however, would probably not turn away definite business for this or next month at 23s. 6d., while many would take 23s. For forward and for next year, they would possibly not break 24s., but would accept a good deal of business at this figure. Seconds are called 21s. to 22s. f.o.b.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

The market in the Midlands is very inactive. Some of the collieries are working only three days a week. Notwithstanding the curtailment of output, supply is more than keeping pace with demand. Merchants are taking precautions to avoid the accumulation of stocks, having regard to the uncertainty which characterizes the outlook. Reserves are maintained on an adequate scale at the bigger industrial establishments; but the course of business is being closely watched, purchases being strictly proportioned to current consumption. Manufacturers in a smaller way of business are buying from hand to mouth. The stringency in regard to slacks has been relieved during the holiday season. There is a superabundance, however, and values remain steady. Householders are not accepting the inducements to lay in winter stocks so freely as could be wished. Less progress has been made in this direction than usual. Ironmasters fear that a quickening of demand for export will baulk them of the concession for which they are pressing. With a drooping market for iron and steel, the fuel situation is viewed with increasing anxiety. There is a suspension of operations at some of the Black Country blast-furnaces owing to rearrangements of plant. A resumption will be made as market developments provide outlets for the production. It is not anticipated that the stoppage will be of long duration.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From a Local Correspondent.

There is no special change to report in the Yorkshire and Lancashire coal markets. The house fuel trade is quiet; the industrial outlook shows practically no improvement, though the recent reduction in the price of pig iron has resulted in a certain amount of new business; while the export section is still suffering from the unsettled state of the rate of exchange on the Continent. There is no doubt a very great foreign demand for coal; but it cannot be met with the present chaotic currency conditions. In Lancashire, however, the shipping trade is reviving again after the break caused by the dock strike.

Although the markets are so quiet, collieries are able to work full time and dispose of their output, and appear to be in no way weakening in the matter of prices. The f.o.b. prices at Hull at the week-end were: Best Yorkshire hards, 25s. to 25s. 6d.; Derby best hards, 24s. 6d. to 25s.; West Yorkshire Hartleys, 21s. to 23s.; South Yorkshire washed doubles and singles, 26s. to 26s. 6d.; dry doubles, 22s.; South Yorkshire washed smalls, 19s.; Yorkshire ½-in. dry slack, 19s.; South Yorks. rough slack, 15s.; gas coke, 16s.; foundry furnace coke, 36s.; washed smithy peas, 46s.; washed steam thirds, 24s.; South Yorks. washed trebles, 26s. 3d.; gas coke, 36s. to 37s. per ton. The latest Lancashire prices include: Best house coal, 33s.; second qualities, 26s. to 28s.; industrial coal, 20s. to 22s.; slacks, 12s. to 15s., all per ton at the pits.

Wellingborough Gas Light Company, Ltd.—The profit of the Company for the half-year ended June 30, after providing for interest and income-tax, amounted to £5050; and with the sum brought forward from the last account there is an available balance of £8562. The Directors recommend dividends for the half-year of 7½ p.ct. on the original shares and 6 p.ct. on the additional shares, less income-tax, which will leave £5136 to be carried forward. The price of gas will be reduced by 3d. per 1000 c.ft., or 0·65d. per therm, from next month's reading of the meters. The Directors have revised the co-partnership scheme, in order that employees may again receive a share in the profits made by the Company. They have also inaugurated a pension fund, which appears to be greatly appreciated by the employees. Acting under the powers conferred on them at the last general meeting, the Board have issued 7000 "additional" shares of £1 each. "The ready sale of these shares, at a premium amounting to £6712," they add, "is a pleasing proof of the continued confidence of the investing public in the business and prospects of the Company."

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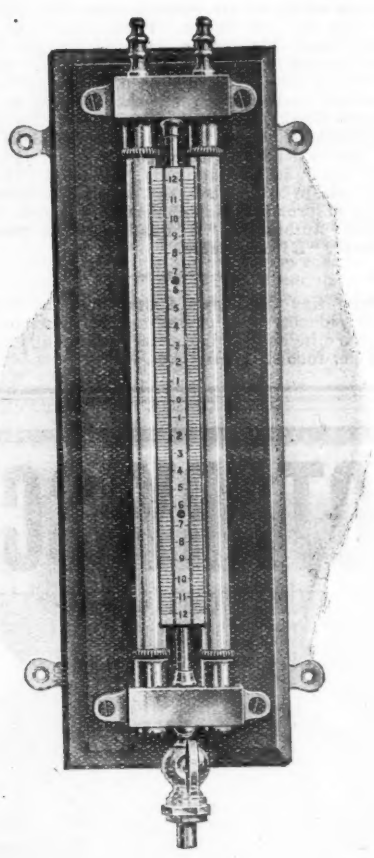

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STOCK MARKET REPORT.

THE Stock Exchange opened last week in uncertain mood, attributed to the British reparation note as published, and markets began to look shaky. Tuesday brought alternations of ups-and-downs, the latter prevailing. Home Government issues were weak, Rails were very irregular, and in the Foreign Market Turks alone held on. The week went on from bad to worse. Markets became inanimate under the influence of the holiday season, and prices nearly everywhere went to pieces—gilt-edged being prominent among them. By Friday, business had thinned down almost to annihilation point; but Home Rails made one or two mild advances.

Business in the Gas Market could not expect to be wholly immune, and it had the barest week's work experienced for a long time. But the characteristic firmness remained unimpaired. Some half-dozen issues were minutely varied in quotation, and of these only one was lowered.

The following transactions in gas during the week were recorded: On Monday, Bombay 5⅜, 5 7/16, Brentford "B" 103, 103½, British 11⅛, Cape Town 7¼, Croydon sliding-scale 102½, European 7½, Gas Light ordinary 96, 96½, 96⅝, 97, ditto 3½ p.ct. maximum 65½, 66, Imperial Continental 160½, 161, 162, Primitiva 6s. 4½d., South Metropolitan 97½, Wandsworth Wimbledon 111⅞, 112, 112⅜, British "B" 11, South Suburban 7 p.ct. debenture 104. On Tuesday, Alliance and Dublin 66, Brighton and Hove "A" ordinary 133½, 134½, British 12, Continental Union 35, Gas Light ordinary 96½, 96⅜, 96½, ditto 3½ p.ct. maximum 65½, ditto 3 p.ct. debenture 61⅛, Imperial Continental 161½, Liverpool 7 p.ct. preference 106½, 107 7/16, Primitiva 6s., 6s. 6d., South Metropolitan 96⅜, 97¼, ditto 3 p.ct. debenture 62, Tottenham "B" 101, 102, Wandsworth "B" 114, British "B" 11, Leatherhead 5 p.ct. 9 5/16, Southgate 7 p.ct 102. On Wednesday, Continental Union preference 75½, European 7¼, Gas Light ordinary 96⅜ 96½, ditto 3½ p.ct. maximum 66, 66½, ditto 4 p.ct. preference 81, 81½, Imperial Continental 161½, ditto 3½ p.ct. debenture 76, Primitiva 6s., ditto 5 p.ct. preference 30s., South Metropolitan 97⅜, 98, ditto 3 p.ct. debenture 61½, ditto 6½ p.ct. debenture 108, Tottenham "B" 102, British "B" 12, 12¼. On Thursday, Bournemouth "B" 12¼, Croydon sliding-scale 102½, European 7⅜, Gas Light ordinary 96½, 96⅜, 96⅝, 97, Imperial Continental 162, Primitiva 6s. 9d., ditto 5 p.ct. preference 30s., South Metropolitan 97⅜, 98, South Suburban 103, 103½, Metropolitan of Melbourne shares 8 1/16, 8⅛, Southgate 7 p.ct. 104. On Friday, Croydon sliding-scale 103½, Gas Light ordinary 96½, 96⅝, ditto 4 p.ct. preference 82, ditto 3 p.ct. debenture 62, Imperial Continental 162, South Metropolitan 97⅛, 98, ditto 3 p.ct. debenture 63, ditto 6½ p.ct. debenture 108½, Wandsworth "C" 101, ditto New 101, Barnet 4 p.ct. debenture 75, 75½.

In the Money Market, there was a pretty constant demand all the week; but it varied constantly from time to time in its proportions. By mid-week it was a question whether available supplies would meet the case, and on Thursday rates were stiffened. The tension, however, was relieved next day, and the closing position was comfortable. Discount rates were firmer and showed no disposition to give way. Silver had a slight fall, but steadied. The Bank of England rate is 4 p.ct., as fixed on July 5.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S TRANSACTIONS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Transactions.
£			p.c.					
131,978	Stk.	Aug. 9	—	5%	Aldershot 5 p.c. max. C.	..	72—77*	...
190,492	,,	,,	4	4%	Do. 4 p.c. Pref.	..	70—75*	...
1,551,868	,,	Apl. 5	2½	5%	Alliance & Dublin Ord.	59—64	72—77	66
374,000	,,	July 12	4	4%	Do. 4 p.c. Deb.	76—79	62—67	..
280,000	5	May 17	7½	4/-	Bombay, Ltd.	5⅛—6⅛	5⅛—5⅛	5⅛—5 7/16
100,000	5	Aug. 9	16	8/6	Bournemouth Gas and Water: 5 p.c.	..	11⅞—12⅛*	...
383,110	10	,,	7	7/-	Bournemouth Gas and Water: B 7 p.c.	15—15½	11⅞—12⅛*	12⅛
115,000	10	,,	6	6/-	Bournemouth Gas and Water: Pref. 6 p.c.	13½—14	10⅞—11⅛*	...
162,065	—	June 28	—	4%	Bournemouth Gas and Water: 4 p.c. Deb.	..	77—82	..
992,045	Stk.	July 12	14	6l/-	Brentford A Consolid.	261—266	100—105	...
734,920	,,	,,	11	6l/3	Do. B New	204—209	100—105	103—103½
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	83—88	..
221,400	,,	June 14	4	4%	Do. 4 p.c. Deb.	91—93	77—82	..
214,775	,,	Mar. 8	11	11½%	Brighton & Hove Orig.	208—213	175—180	...
244,200	,,	,,	8	8½%	Do. A Ord. Stk.	154—159	130—135	133½—134½
1,272,500	Stk.	July 26	5	5%	Bristol 5 p.c. max.	..	97—98	..
570,000	20	Mar. 22	12½	10/-	British A Ord.	44—45	12—13	11½—12
10,000	10	June 28	—	7/-	Do. 7 p.c. Pref.	..	11⅞—12⅛	...
120,000	Stk.	,,	4	4%	Do. 4 p.c. Deb. Stk.	88—90	74—79	...
220,335	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	56—59	..
100,000	10	May 17	—	—	Cape Town & Dis., Ltd.	1⅛—2⅛	6⅞—7⅛	7⅛
100,000	10	May 3	—	4/6	Do. 4½ p.c. Pref.	4—6	6—7	...
100,000	Stk.	June 28	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	70—75	...
237,860	,,	,,	—	7½%	Cardiff 7½ p.c. Deb.	..	106—111	..
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	..	...
1,513,280	,,	July 25	5/9/4	60/-	Commercial 4 p.c. Stk.	106—108	94—97	...
560,000	,,	,,	5⅛	60/-	Do. 3½ p.c. do.	103—105	94—97	...
475,000	,,	June 14	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	58—62	..
800,000	,,	Dec. 15	4	—	Continental Union, Ltd.	76—79	35—40	35
200,000	,,	Dec. 14	7	4%	Do. 7 p.c. Pref.	115—118	72—77	73½
660,000		Aug. 9	—	6½%	Croydon sliding scale.	..	101—104*	102½—103½
284,975		,,	—	5%	Do. max. div.	..	81—85*	...
492,270	Stk.	—	6	4½%	Derby Con. Stk.	123—125	..	...
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	..	...
209,000	,,	Apl. 5	—	5%	East Hull 5 p.c. max.	..	..	...
1,002,180	10	July 12	10	5/0	European, Ltd.	17½—18	7⅛—8⅛	7⅛—7⅛
16,546,120	Stk.	July 26	4/17/4	52/-	Gas Light and Coke: 4 p.c. Ord.	98—102	96—98	96—97
2,600,000	,,	,,	3½	35/-	Gas Light and Coke: 3½ p.c. max.	76—79	63—68	64½—66½
4,062,235	,,	,,	4	4%	Gas Light and Coke: 4 p.c. Con. Pref.	96—99	80—82	81—82
4,761,930	,,	June 14	3	3%	Gas Light and Coke: 3 p.c. Con. Deb.	72½—74½	60—63	61½—62
130,000	,,	Dec. 11	10	10%	Gas Light and Coke: 10 p.c. Bonds	..	..	...
—	—	—	—	—	Gas Light and Coke: 7½ p.c. Ilford Deb.	..	..	...
82,500	,,	Mar. 8	5	65/7½	Hastings & St. L. 5 p.c.	..	92—97	...
258,740	,,	,,	3½	50/7½	Do. 3½ p.c.	87—89	75—78	...
70,000	10	May 17	11	10%	Hongkong & China, Ltd.	16½—16⅝	15—16	...
86,600	Stk.	Mar. 8	9	9½%	Hornsey 7 p.c.	..	147—152	...
1,976,000	,,	May 31	9	£17	Imperial Continental	150—160	158—163	160½—162
404,800	,,	Aug. 9	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	76—78*	76
235,242	,,	,,	6½	6½%	Lea Bridge Ord. 5 p.c.	119—121	95—100*	...
2,498,903	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord.	..	..	...
600,000	,,	Mar. 22	—	7%	,, 7 p.c. Pref.	..	106—109	107½—107 7/16
165,736	,,	Feb. 22	7/5/6	80/-	Maidstone 5 p.c.	..	107—112	...
63,480	,,	June 28	—	3%	Do. 3 p.c. Deb	..	52—57	...
75,000	5	June 14	6	3/6	Malta & Mediterranean Met. of Melbourne: 4½ p.c. Deb.	4⅛—4⅜	3⅛—4	...
100,000	100	Apl. 5	4½	4½%	Montevideo, Ltd.	99—101	97—100	...
541,920	Stk.	May 17	4	4%	Newcastle & Gatsh'dCon.	11½—12	50—55	...
1,875,892	,	July 25	4½	4½%	Do. 4 p.c. Pref. Stk.	98½—99½	84⅛—85½	85
250,166	,,	Aug. 9	—	4%	Do. 3½ p.c. Deb.	..	74½—76*	...
529,705	,,	June 28	3½	3½%	North Middlesex 10 p.c.	82—83	71—73	...
15,000	10	Aug. 26	—	7/6	,, 7 p.c.	..	..	...
55,940	10	Mar. 8	7/14/0	7/8⅜	Oriental, Ltd.	14—15	12—13	...
300,000	Stk.	May 3	8	8%	Plym'th & Stonh'se 5 p.c.	117—122	97—102	...
188,120	Stk.	June 28	—	78/9	Portsea Island, B	..	106—110	...
60,000	50	Mar. 8	13	65/-	Do. C	128—131	103—108	...
100,000	50	,,	12	60/-	Primitiva Ord.	118—121	100—105	...
290,059	5	—	8	—	Do. 5 p.c. Pref.	5⅛—6	⅛—⅜	6/- —6/9
499,960	5	—	5	—	Do. 4 p.c. Deb.	4⅛—5	1⅛—2	30/-
521,600	100	June 1	4	4%	Do. ,, ,, 1911	91—93	73—75	...
600,000	Stk.	July 26	4	4%	River Plate 4 p.c. Deb.	..	56—59	...
346,198	,,	June 28	4	4%	San Paulo: 6 p.c. Pref	85—87	56—59	...
150,000	10	Mar. 22	6	6/-	San Paulo: 5 p.c. Deb.	10½—11	5⅜—6⅛	...
125,000	50	July 2	5	5%	Sheffield A	47—49	38—41	...
135,000	Stk.	Mar. 22	10	5%	Do. B	223—224	104—106	...
209,984	,,	,,	10	5%	Do. C	223—224	104—106	...
52[illegible],500	,,	,,	10	5%	Shrewsbury 5 p.c.	220—229	103—105	...
133,201	Stk.	Sept. 15	4	4%	South African	..	..	...
90,000	10	May 31	9	9/-	South Met. Ord.	10½—11⅛	8—10	...
6,609,895	Stk.	July 26	5/4/0	50/-	Do. Red. Pref.	111—113	96—98	96⅛—98
250,000	,,	July 12	—	5%	Do. 3 p.c. Deb.	..	97—99	...
1,895,445	,,	,,	3	3%	Do. 6½ p.c. Deb.	72½—74½	61—63	61½—63
734,000	,,	Mar. 8	—	6½%	South Shields Con. Stk.	..	107—109	108—108½
91,500	,,	Feb. 22	8½	4½%	S'th Suburb'n Ord. 5 p.c.	157—159	129—131	...
1,087,795	,,	,,	6	6%	Do. 5 p.c. Deb. Stk.	114—116	102—105	103—1 3/16
368,837	,,	June 28	5	5%	S'th'mpt'n Ord. 5p.c. max.	116—118	95—100	...
647,740	,,	May 3	5	7½%	Do. 4 p.c. Deb. Stk.	99—102	88—91	...
121,275	,,	June 28	4	4%	Swansea 7 p.c. Pref. Stk.	..	72—77	...
250,000	,,	Mar. 8	—	70/-	Do. 6½ p.c. Deb. Stk.	..	103—105	...
200,000	,,	June 28	—	6½%	Tottenham: A 5 p.c.	..	105—107	...
120,000	,,	July 26	—	8%	Tottenham: B 3½ p.c.	135—138	120—125	...
782,275	,,	,,	6	6½%	District: 4 p.c. Deb.	115—117	100—105	101—102
181,255	,,	June 14	4	4%	Tynemouth 5 p.c. max.	87—89	78—82	...
258,251	Stk.	Mar. 22	5	5%	Wandsworth, Wimbledon, and Epsom—	108½—109	90—92	...
30,000	,,	July 12	8½	90/-	Wandsworth A 5 p.c.	151—156	126—131	...
255,636	,,	,,	6½	75/-	Do. B 3½ p.c.	129—134	112—117	114
108,075	,,	,,	—	63/-	Do. C	..	97—102	101
140,865	,,	,,	—	63 -	New Ordinary	..	97—102	101
352,000	,,	,,	6½	71/3	Wimbledon 5 p.c.	117—122	109—114	111½—112½
98,000	,,	,,	6½	76/3	Epsom 5 p.c.	121—126	112—117	...
88,416	,,	June 28	3	3%	3 p.c Deb. Stk.	66—69	57—60	...

* Ex. div.

THE MALTBY COLLIERY FUND.

THE Maltby Colliery disaster has served to demonstrate once again the heroism of the Yorkshire miner; and the proprietors of the "Sheffield Independent" and "Sheffield Mail" have opened a Shilling Relief Fund for the dependents of the 27 brave men who gave their lives in attempting to safeguard their workmates. There are 22 widows and 57 fatherless children; the overwhelming majority of the latter being under 14 years of age. Subscriptions of one or any number of shillings will be gratefully received at the office of the "Sheffield Independent," Newspaper House, No. 21, Fargate, Sheffield, and will be acknowledged in the columns of the paper.

A Larger Output and Lower Prices at Monifieth.—Councillor Fleming (the Convenor of the Gas and Lighting Committee) reported to the Monifieth Town Council last week an increase in the output of gas for the past year, and recommended that there be a reduction of 6d. per 1000 c.ft., making the price now 5s. This was agreed to.

Hathersage Gas Company.—In their eighteenth annual report, the Directors of the Hathersage and District Gas Company show a profit on the revenue account of £1761. This, together with the unappropriated balance carried from the previous year, leaves £1807 as the disposable surplus. The Directors recommend the payment of a dividend of 5 p.ct. for the half-year, making a total of 8½ p.ct. for the year, less tax. They also recommend that £200 be carried forward to the reserve, and that £1233 be transferred to the current year's accounts.

Nottingham Gas Employees' Strike.—The strike of a section of employees in the Gas Department of the Nottingham Corporation continues, with no immediate prospect of a settlement. The matter was brought under consideration on Thursday at the annual conference held at Ilfracombe of the National Federation of Building Trade Operatives, with which branch stove fixers and others are now associated. The decision was come to at the Ilfracombe assembly to seek a conference with the National Union of General Workers, with a view to approaching the Nottingham Committee upon the subject of the dispute. But the suggested *modus vivendi* comes too late to serve any practical purpose; the Nottingham authorities having no further need of the services of men who have become the victims of trade union machinations.

Proposed Extensions at Blackburn.—Mr. A. W. Breightmore, D.Sc., M.Inst.C.E., conducted an inquiry at Blackburn last week, respecting the application of the Blackburn Corporation Gas Committee for permission to borrow £30,000 for extensions and improvements at the Greenbank works. Sir Lewis Beard (Town Clerk) said that in consequence of the increased consumption of gas, it was necessary to enlarge the vertical retorts at Greenbank. This course was proposed because it was considered to be cheaper than building additional retorts. On this part of the work, he estimated that £22,000 would be expended. The capital cost of the existing retorts was £160,000, part of which was post-war expenditure. If extra facilities were provided as suggested, much more gas would be produced. More steam would also be required. At present the steam was generated in Lancashire boilers, and no use was made of waste heat from the retorts. By the new scheme it was proposed to utilize this waste heat by the installation of a steam plant at a cost of £8000. The Town Clerk also mentioned that, during the last four years, Mr. G. P. Mitchell (the Gas Engineer) had replaced a large number of mains by larger ones, at an expenditure of £62,000. Formerly there were many complaints by users about the gas supplied. This was due to the pressure, and not to the quality of the gas. Since the new mains were installed the complaints made had been negligible. Mr. Mitchell explained the scheme in detail. This closed the inquiry.

Unlawfully Obtaining Gas.—At Kidderminster, on Friday, Walter McLatchey, of Coventry Street, was charged with tampering with the gas-pipes belonging to the Kidderminster Gas Company. It was stated that the fitter found the meter had been disconnected, and the service pipe connected to the house supply pipe by a rubber tube which was fitted into the two unions. Defendant, admitting the offence, said he had not used more than twopennyworth of gas. A fine of £5 was imposed.

The Barnet District Gas and Water Company.—The half-yearly general meeting of the Company will be held next Monday, when the accounts for the half-year ended June 30 will be submitted. The balance standing to the credit of profit and loss account amounts to £37,161, out of which the Directors recommend the declaration of statutory dividends, less income-tax, at the rate of 10 p.ct. per annum on the "A," "B," and "C" stocks, and 7 p.ct. on the "D" capital gas and water stocks. The price of gas will be reduced 1d. per therm to ordinary consumers from the readings of the meters at the midsummer quarter, and to prepayment consumers as soon as the necessary alterations of mechanism can be effected.

The Midleton (co. Cork) Gas Company have decided to extend the gas supply to Ballinacurra, a seaside resort situated about a mile from the town.

Upon the recommendation of the Gas Committee, consumers at Newport (Fife) are to have a reduction in price of 9d. per 1000 c.ft., making the charge 4s. 7d.

The Haltwhistle Parish Council have accepted a tender submitted by the Gas Company to light the street lamps for a period of not less than 32 weeks for £3 5s. per lamp.

Kirkham Gas Company have declared a dividend at the rate of 8 p.ct. for the year for the last six months' working. The profits on the half-year's working were £615. A reduction in the price of gas is also announced.

The Buxton Town Council have decided to make further substantial reductions in the price of gas to ordinary consumers as follows: Lighting, 3s. 9d. per 1000 c.ft.; cooking and heating, 3s. 6d.; gas-engines (per separate meter), 3s. 3d. per 1000 c.ft.

The report of the Rossendale Union Gas Company for the last half-year shows a decrease of about 3 p.ct. in the sales compared with those of last year. On new services £176 was expended, and on new meters £709. The profit was £5184; and the customary dividends, ranging from 10 to 5 p.ct., are being paid on varying classes of shares.

An explosion which occurred in Liverpool last week did damage to house property in the neighbourhood, but was not attended by personal injury. It is thought that subsidence in the pavement caused a gas-main to break, and that the escaping gas made its way along a subterranean passage which runs the whole length of Back Salisbury Street, the scene of the explosion.

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